THE IRON AGE

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New York, Thursday, June 4, 1908.

Electric Welding and Some of Its Products.

The welding of metals by whatever means employed requires that the surfaces to be joined be heated to a plastic condition and forced together with pressure sufficient to intimately unite all parts of the contacting surfaces. A perfect weld should be as strong as any other equal section of the parts welded, but this can only be achieved when air, scale and all other foreign materials are excluded from the joint. The oldest process of welding employed a forge fire for the heating. Later developments were the blow pipe processes, and most recently those using the oxy-acetylene torch, and the electric welding processes. Of the latter there are two, the arc process and the resistance process, also known by the name of the inventor as the Thompson process. It is this which is employed by the Electric Welding Products Company, Cleveland, Ohio, formerly the Cleveland Cap Screw Company, in the manufacture of various machine, engine, automobile and other metal parts.

The metals are heated for welding by the resistence they impose to the passage of an electric current. The parts are held in copper dies with clamps, and when at the proper heat, which can be accurately judged with the eye, they are forced together with horizontal pressure sufficient to throw out a burr at the joint and form a positive weld. The process is clean, accurate and sure, as the clean welding surfaces are heated uniformly and no foreign matter can enter into the weld. The machine pressure which finishes the job may be regulated to insure a perfect weld. Advantages are claimed for the Thompson process over others. For example, the arc process is less uniform, since the metal is heated from the outside to the center, which often means that the outside metal is burnt before the center is ready for welding. The intense heat, light and noxious fumes accompanying it are also cited as objections, and these are in a measure common to the different blow pipe processes. Hand or forge welding is slow and laborious, and so much depends upon the workman that accurate and strong welds are not as certain. Opportunity always exists for foreign substances to enter into the weld when parts are heated in an open fire, and small parts or metals of different nature cannot be handled satisfactorily at all by this process.

Fig. 1.—Views in the Plant of the Electric Welding Products Company, Cleveland, Ohio.

A—Hand Machine Finishing Department; B—Machine Shop and Hand Screw Machine Department; C—Semiautomatic Department; D—Section of Welding Department; E—Automatic Machine Department.

Before discussing the products made for the market by this company it may be interesting to examine the views in the company's various departments, given in Fig. 1. That designated as A is the hand machine finishing department; B, the machine shop and hand screw machine department; C, the semi-automatic department for finishing screws, &c.; D, a section of the welding department, and E, the automatic machine department for making heads, disks and other parts to be welded. In the years that the company was principally engaged in the making of cap screws, the head and body of which

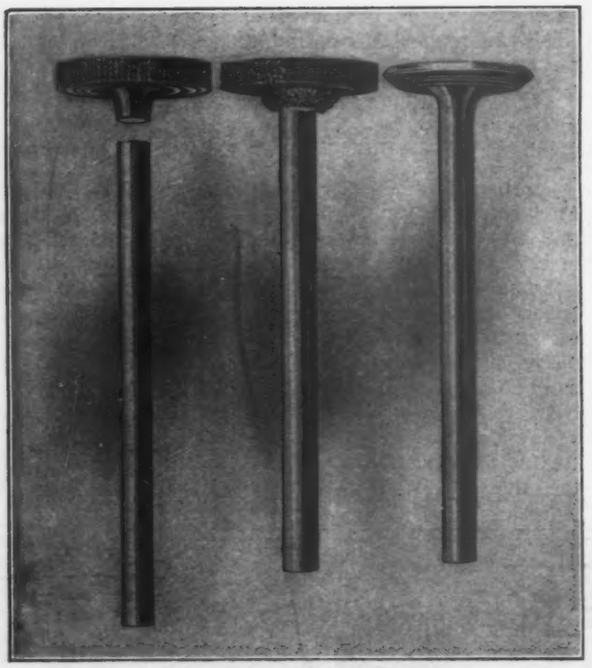


Fig. 2.—Stages in the Making of a Gas Engine Valve Stem with Nickel Steel Head and Carbon Steel Stem.

were joined by electric welding, it gained an experience that it is putting to advantage in the greater range of products which it is now manufacturing, and which caused the name of the company to be changed to one more fitting its present business.

By combining in one piece two different pieces of metal in a part subjected to diverse duties it has become possible to make many machine parts cheaper and more serviceable than before. The valve stem of a high speed gas engine is an example, a little thing which has given a great deal of trouble in gas engine construction, because it was soon destroyed by the deteriorating and corrosive action of the exhaust gases. Such parts are now made by this company, as shown in Fig. 2, which represents three stages in the process of welding a nickel steel head to a carbon steel stem. The nickel steel does not pit, warp nor corrode as does common steel and is much tougher. The stem being made of carbon steel stands the wear of the guide better than a nickel steel stem would. It is stiffer and can be hardened on the end to withstand the cam blow where nickel steel cannot. The construction is not only more desirable but cheaper, both by saving the use of so much high priced metal and the labor that a machine finished forging would require. The valve stems are frequently made with cast iron heads, but cast iron is brittle and likely to break, and it is almost impossible to fasten a cast iron disk on a stem so that it will not wear loose in use, giving rise to leakage.

Another of this company's products is a screw with a brass head and a steel body, which is more than 50 per cent. stronger than an all brass screw, and may be used in place of the latter for ornamental purposes where the head shows. Here again economy as well as additional strength is secured. This is also the case in the making of pinion blanks, the large ends or heads of which can be made of a high carbon steel and the body of mild steel, the teeth being cut in the high carbon steel head. As can readily be appreciated there are very many applications of a similar nature that may be of value in the manufacturing industries.

Fig. 3 shows the three stages in the making of a cap screw. The company has had a very interesting report on the strength of such bolts from the Wellman-Seaver-Morgan Company, Cleveland, Ohio, some of the data from which is given in the following table:

	Cleveland Cap screw, ordinary stock.	Twelve other makers' ordinary stock.	Cleveland Cap Company's greater strength. Per cent.
Per square inch.....	½ to 1¼ in.	½ to 1¼ in.	½ to 1¼ in.
Average tensile strength..	97,862	56,570	73
Maximum tensile strength.	116,400	53,750	82
Minimum tensile strength.	81,750	52,200	53½
Calculated equivalent tensile strength per square inch, from torsional tests....	105,475	63,154	..
Single shear, per square inch	51,250	37,050	..

It was found in all of the tests that the body of the cap screw is of a quality of material superior to that ordinarily used in such work, and that the cap screws in no case gave way in the weld. A special test was made of a part having a round rod body with a head welded on each end. This was submitted to a torsional test, and after twisting through 85 degrees gave way in the head and not in the weld.

The reason why bolts and screws made by this process are so much stronger is because the die drawn surface of

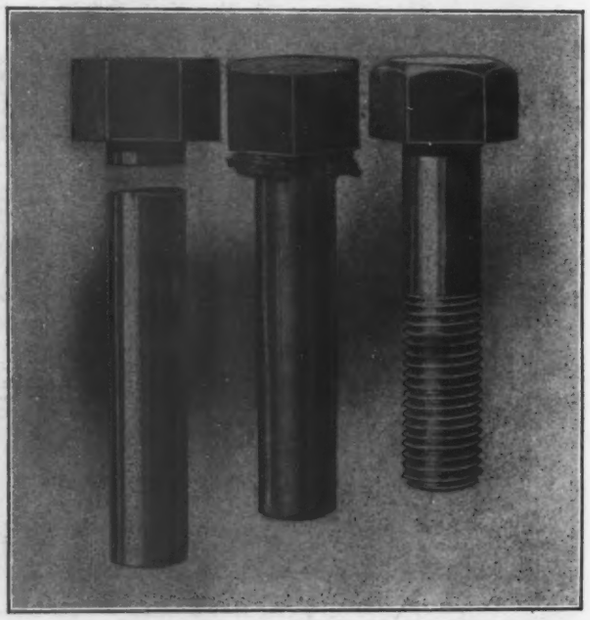


Fig. 3.—Stages in the Making of a Cap Screw with a Welded Head.

the stock is retained on the body, which is much stronger than the center or inside of a bar machined down to the body size from the head size. Often also an inferior grade of stock is used, which of course is not as strong.

Another valuable use of this process is in the welding

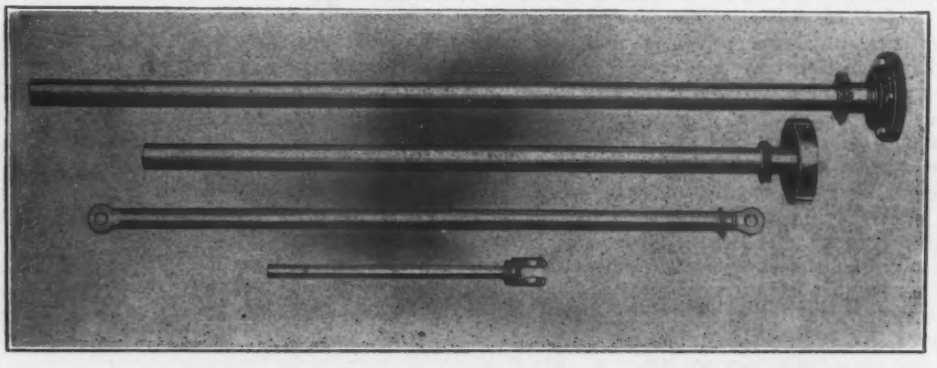


Fig. 4.—Examples of Forged Ends Welded to Solid or Tubular Shafts.

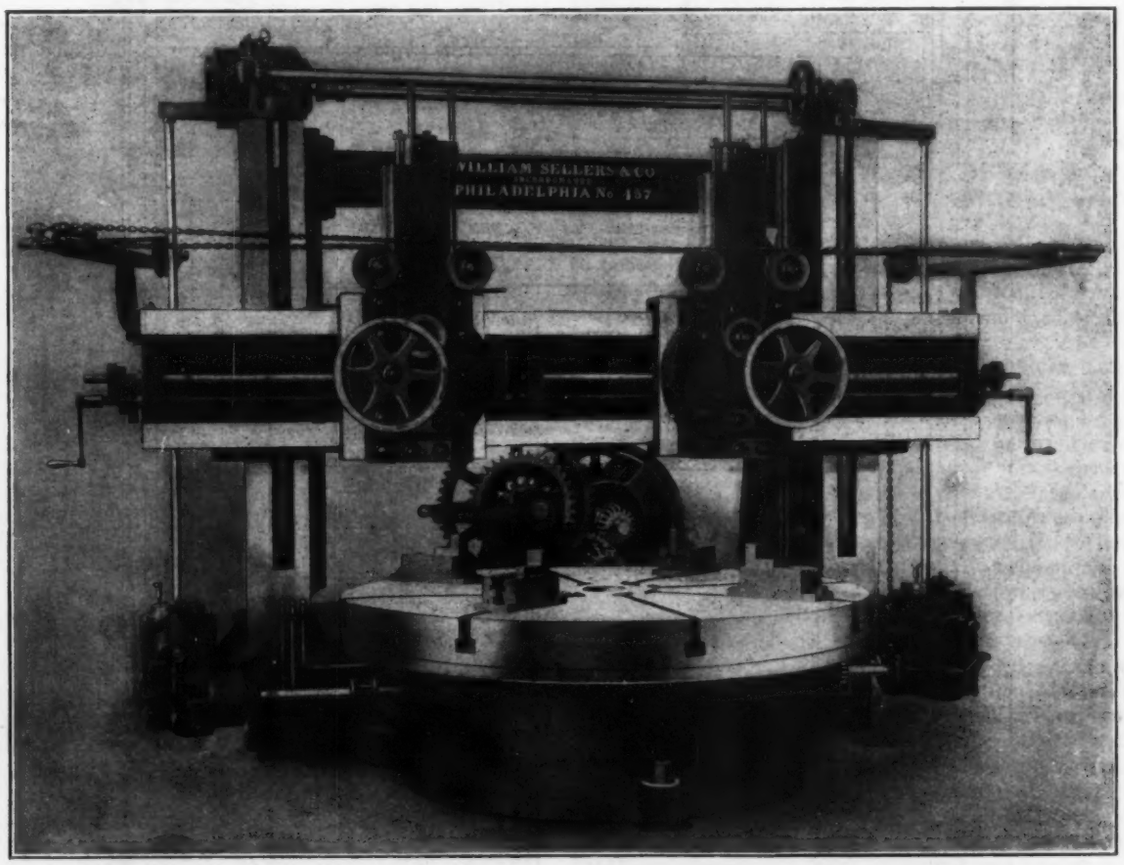
together of two simple forgings making one piece, which in itself might be extremely difficult, if not impossible, to forge. Forgings can be welded to shafts, tubular or solid, as connecting rods, transmission shafts, cam shafts and similar parts. There are those who favor tubular construction in rods of this kind with forged ends welded on. The weight is considerably reduced and an equal and often greater strength can be secured. Fig. 4 shows examples of rods and shafts with forgings welded on the ends.

Electric welding by the resistance or incandescent process has demonstrated its practicability, reliability and economy, and the almost endless variety of its possible applications seems to insure it a very important place in the field of machinery manufacture especially. Hindered as it has been by some prejudice against it from the failures which resulted at the early stages of its development it is not to be wondered that its adoption has been slow, but as it seems to have successfully emerged from the probationary stage there is every reason to expect that in the present improved and perfected state of the art it will be more extensively employed.

The British Iron Trade Association.—The annual meeting of the British Iron Trade Association was held May 13, at the Westminster Palace Hotel, London, with A. Findlay, M.P., presiding. The annual report stated that there were no signs of an early improvement in the iron trade. Reference was also made to the chief unfavorable features, the lower prices of iron and steel products, enhanced cost of raw materials, and slackness of the shipbuilding industry, in which 30 per cent. of all the iron and steel produced in the country was used. Although British makers had not received an adequate share of the world's trade in rails, yet in view of the complaints made as to the quality of rails in different parts of the world, it was satisfactory to record that the reputation of British-made steel rails remains very high. Mr. Shelton said that the unfavorable position of Great Britain was due in part to the want of an adequate supply of iron ore, and that the great development of Germany was promoted by the ability on the part of the Germans to use phosphoric iron ore deposits. Sir J. S. Randles, M.P., said that sooner or later in the iron and steel trade Great Britain should have to look at the effect of foreign tariffs on its production and the sale of manufactured articles.

A Sellers Motor-Driven Boring Mill.

Boring and turning mills although first developed in England, have been so improved by American builders that they are more extensively used in this country than in any other. They have a very wide range of application and often replace lathes, particularly when the work is such that it can be more rapidly set up on a horizontal face plate. Frequently a number of comparatively small pieces can be mounted at a time on the table, or two or more tools can be operated simultaneously, thus materially increasing the economy of production. To procure the greatest output from such a tool all of the driving and feeding movements must be conveniently controlled and the idle movements rapidly accomplished so that the tool can be kept actually working as much of the time as possible. Contributary to the desirable result a variable speed motor may be used for the drive, thus giving the proper cutting speed with the least loss of time in changing speeds, the controller handle being placed within convenient reach of the operator.



An 84-In. Boring Mill Built by William Sellers & Co., Equipped with a Westinghouse Motor.

The boring mill shown in the illustration is one built by William Sellers & Co., Inc., Philadelphia, Pa., and is capable of taking work up to 84 in. in diameter. The variable speed motor supplied by the Westinghouse Electric & Mfg. Company, has a speed range of 2½ to 1, giving the table any speed between 1 and 23.8 rev. per min. with the exception of two small gaps. The feed may be varied from 1-32 to ¾ in. per revolution of the table in eight steps. The machine is entirely self-contained and the only part extending below the floor line is the lever for adjusting the step bearing of the table spindle, which is accommodated by a trough 7 in. wide by 7 in. deep. In addition to this adjustable step bearing the table has a flat bearing under its rim. Using individual motor drive the machine may be located where the work will require the least handling, and the wide range of speeds available permits turning work of various diameters at the maximum cutting speed allowable for each.

The Keystone Works of the Jones & Laughlin Steel Company.

The Keystone Works is the title of the new structural plant of the Jones & Laughlin Steel Company, recently erected on the site of the Keystone Rolling Mill on Second avenue, Pittsburgh, Pa. It is located on the north side of the Monongahela River, on an approximately rectangular plot 540 ft. in length and 400 ft. in width, having an area of about 5 acres. Formerly it was situated at the extreme western end of the south side plant, but the erection there of large modern mills for structural shapes necessarily with sunken tracks. The foundations, including that of the power plant, are all of concrete, the forms for which were located in advance of the filling, saving expense in excavating.

The accompanying illustrations show the lay-out and leading features of the plant. Fig. 1 is the general plan of the works. Shops Nos. 1 and 2, practically under one roof, with spans of 85 ft. and 55 ft., have a total width of 140 x 260 ft. in length. Shop No. 3 has a width of 60 ft.,

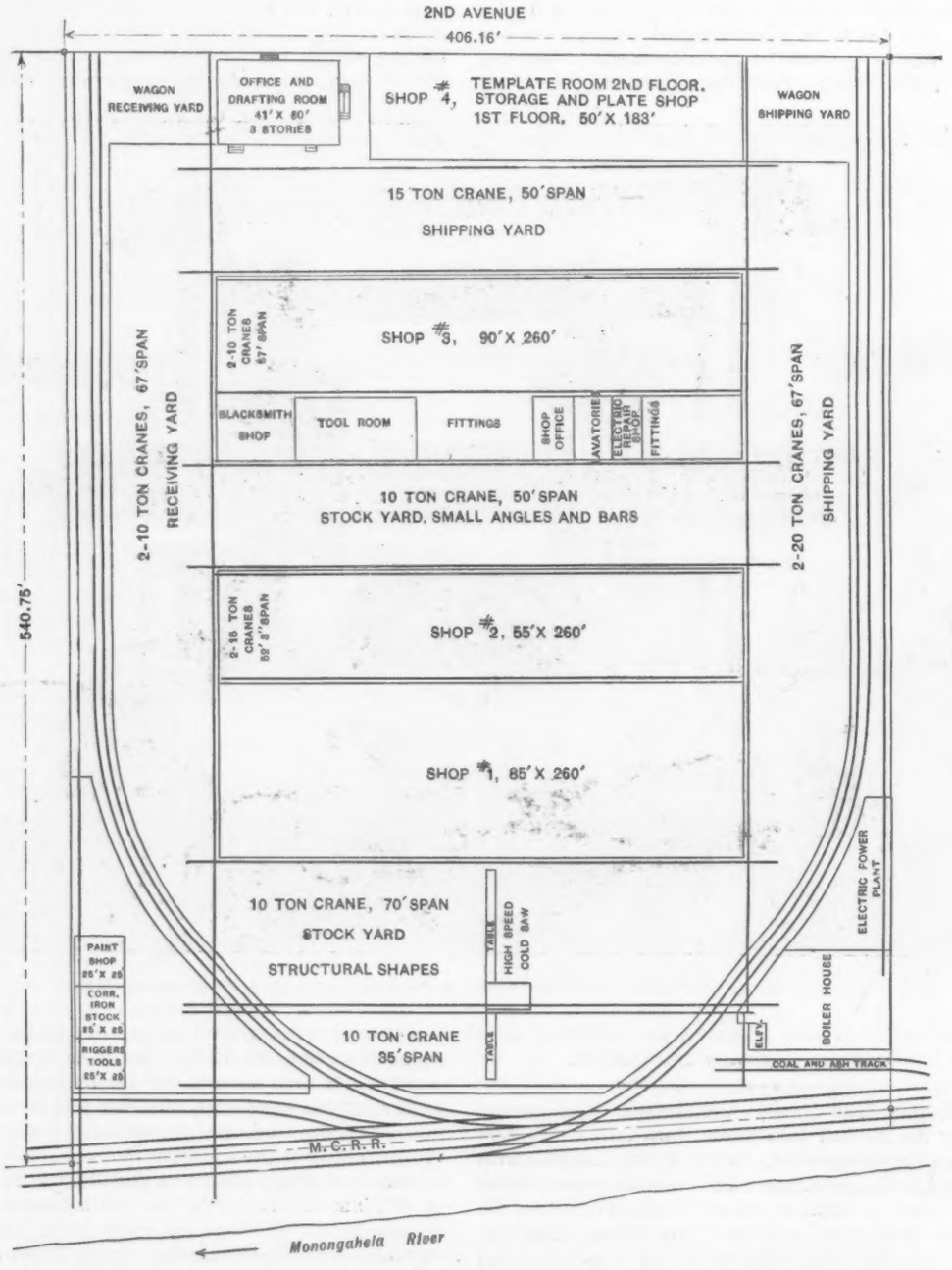


Fig. 1.—General Plan of the Keystone Works of the Jones & Laughlin Steel Company.

and the extension of the open hearth furnace plant rendered its position no longer tenable. It was also the aim of the management to provide better facilities for promptly producing fabricated structural material.

The new location is about midway between the Eliza and Soho furnace plants, allied interests of the same corporation. In order to get out of the reach of all but extraordinary floods, considerable filling was necessary, ranging from 2 to 10 ft. over the entire surface of the property. Railroad connection is had with the Monongahela Connecting Railroad at the river end of the property, with a 30-ft. lean-to, making a total width of 90 ft., maintaining a uniform length of 260 ft. It is well lighted and admirably equipped for the work—the fabrication of columns—for which it is intended.

The lean-to of shop No. 3, Fig. 2, is arranged to take care of the shop office, general lavatory, machine shop, blacksmith shop and various other subsidiary operations. Shop No. 4 is a two-story building running parallel with and next to the street. The lower story furnishes accommodation for the time clock system, by which the employees' time is recorded. The supply department is also

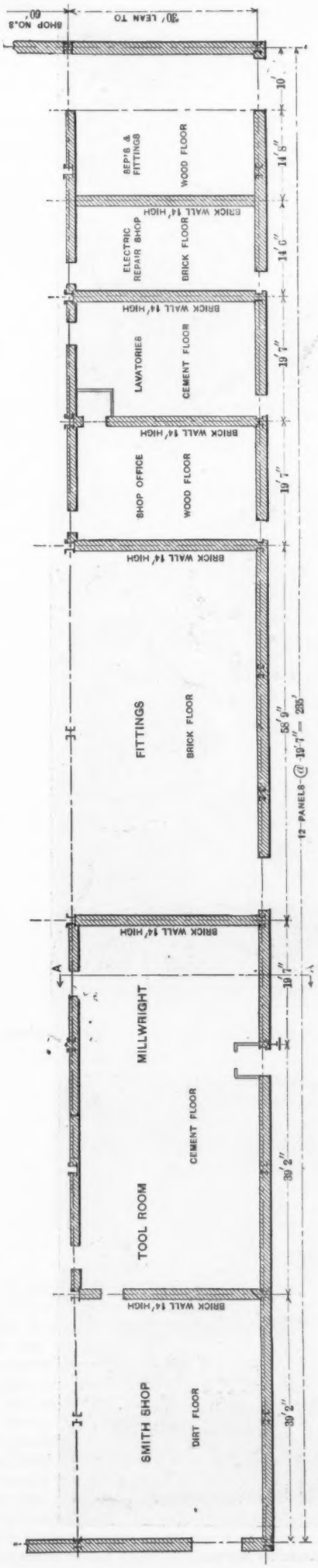


Fig. 2.—Lean-to of Shop No. 3, Keystone Works of the Jones & Laughlin Steel Company.

in this building, conveniently arranged for receipt of team deliveries. A stock of template lumber is carried on this floor. The remaining portion is used as a shop for light plate or sheet work. The second story is used as a template room. It is well lighted and equipped for caring for such work, and is directly connected by a bridge with the drafting room on the second floor of the office building.

It will be seen by reference to the plans that the entire site has been covered with cranes or buildings, or both, the receiving and shipping yards being placed at either end of the shops, the purpose being to carry the work to completion as it is passed through them. A view of the receiving yard is given in Fig. 3. The space between the shops is assigned as stock yards. The river front is used as a stock yard for beams and channels, a representative stock being carried for prompt service. Stock material is piled in a 70-ft. span and after being cut with a high speed hydraulic feed cold saw it is carried on live rollers into the 35-ft. span, whence it can be transported to the receiving yard and thence to the shops, or loaded as plain material directly into cars for shipment. The product of the plant can be shipped either by rail or team.

The cranes, 12 in all, of capacities ranging from 10 to 20 tons, are of the Morgan type. They are distributed as follows: Two in the receiving yard, four in the stock yards, two in the shipping yards and four in the shops. The transverse crane ways, carrying the stock yard cranes, project at either end under the longitudinal runways, thus allowing transfer of material without any unnecessary handling, as shown in Fig. 4. Material can be transferred over the whole plant from one point to another so readily that narrow gauge tracks have, therefore, been almost eliminated.

The internal arrangement of the shops was planned with a view of performing certain definite operations in each, but there is sufficient flexibility to allow for the ready execution of various quantities of all classes of work. Shop No. 1, Fig. 5, is arranged primarily for a beam shop, and is well fitted to care for a large tonnage of ordinary punched and framed material. In addition to the punches, coping machines and stationary riveters, there are special tools such as angle rolls, bulldozer, &c. A light telegraph system secured to the bottom chords of the trusses provides an easy means of handling the material, which is usually not excessive in weight.

Riveted work, such as girders, trusses, &c., is fabricated in shop No. 2, Fig. 6. Two electric overhead traveling cranes handle the material to the machines and aid in its assembling. The tools are substantial and of standard types, consisting of a 48-in. gate shear of medium capacity mounted on a turntable; a deep throat multiple punch, arranged with a Thomas spacing table; rotary angle shears, fitting punch, reamers, &c. The assembly skids are secured to foundation beams embedded in concrete, all in perfect alignment, making a good installation with a solid and permanent floor. The riveting is done with pneumatic riveting machines, of which several types are in use. There are also a large number of pneumatic hammers in general use throughout the plant, for work not suitable for the compression riveter.

The column shop, No. 3, Fig. 7, has its full quota of tools, the most important feature being a powerful 42-in. face rotary planer, which, with the assistance of the double ended tool originally in use, furnishes ample capacity for work of this character. An interesting machine located here is a spacer designed by the Standard Bridge Tool Company for punching detail plates without marking them, which, as far as tested, gives great promise of success. Shop No. 4 needs no further description. In the blacksmith shop tool blanks are made under a 5-ton steam hammer, and all the tempering and annealing of finished tools is carried on.

The entire plant is well lighted, most of the buildings having monitors or skylights, the latter being glazed with ribbed glass. It should be noted that all tools are driven electrically, either directly or in groups, the only exception being the bulldozer and 5-ton hammer, which are steam driven. Excellent lavatory facilities have been provided for the men, as, in addition to the instal-

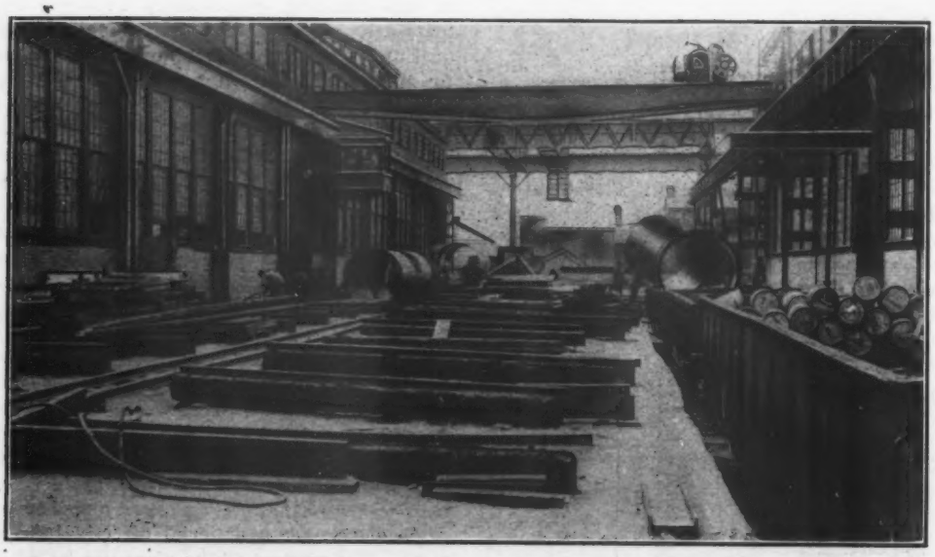


Fig. 3.—The Receiving Yard of the Keystone Works.

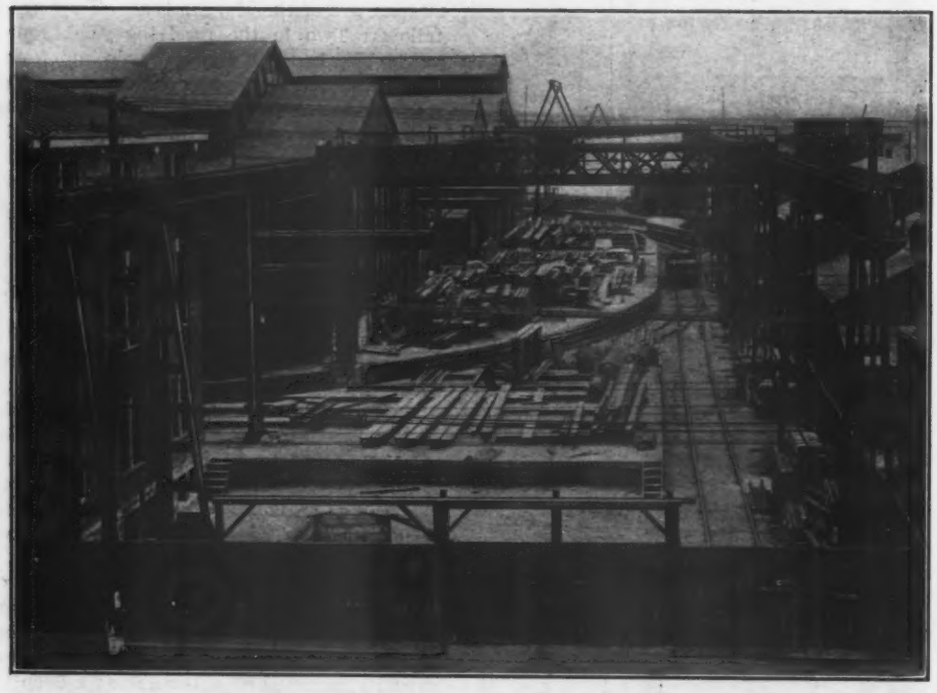


Fig. 4.—One End of the Keystone Works, Showing the Projections of Transverse Craneways Under the Yard Craneway.

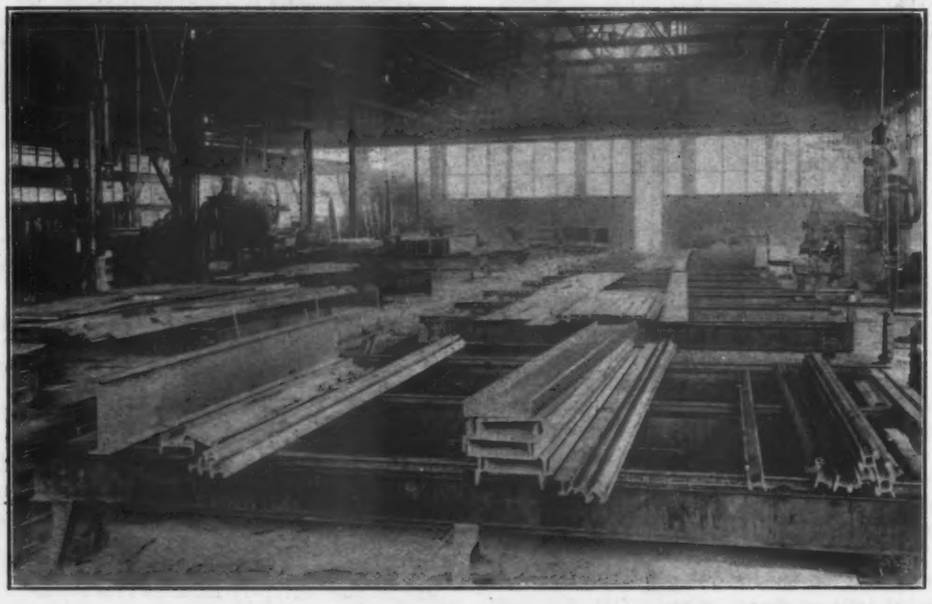


Fig. 5.—The Interior of No. 1 Shop of the Keystone Works.

lation in the general lavatory, there are also other equipments of the same character in Nos. 1 and 4 shops.

The power plant is placed at a higher level than any other part of the works, the purpose being to keep it above the highest range of water that has ever been experienced on the Monongahela River. Two 400-hp. Wickes vertical water tube boilers furnish the steam for operating the 900-hp. single noncondensing Corliss engine. These boilers are equipped with Murphy stokers and the necessary feed water heaters and pumps. The Corliss engine, built by the Wisconsin Engine Company, has direct connection with a 600-kw. Allis-Chalmers generator, providing ample power for all requirements of the plant, including arc and incandescent lighting. The type of current used is 220 volt direct current. The plant is also connected with the power stations of the Soho and Eliza furnaces, so that any temporary disability does not put the works out of commission. Compressed air for pneumatic tools and hoists is supplied by a 24 x 30 in. straight line Rand compressor with two smaller machines, one of the same type and one built by the Hall Steam Pump Company in reserve.

A three-story office building houses the clerical and drafting forces. It is well arranged for taking care of the business of the plant, the executive offices being on the first floor and the drafting room on the second, with room for extension on the floor above. The third floor is partially occupied with a dining room, giving the men an opportunity to eat their lunches out of the offices.

The project was authorized April 16, 1907, and was practically commenced on May 22. On June 17 concrete operations were begun and on August 30 the first tool was turning out fabricated work. The estimated capacity is 50,000 tons per year, and with its ability to turn out a wide range of varied classes of material it should have ample opportunity for development.

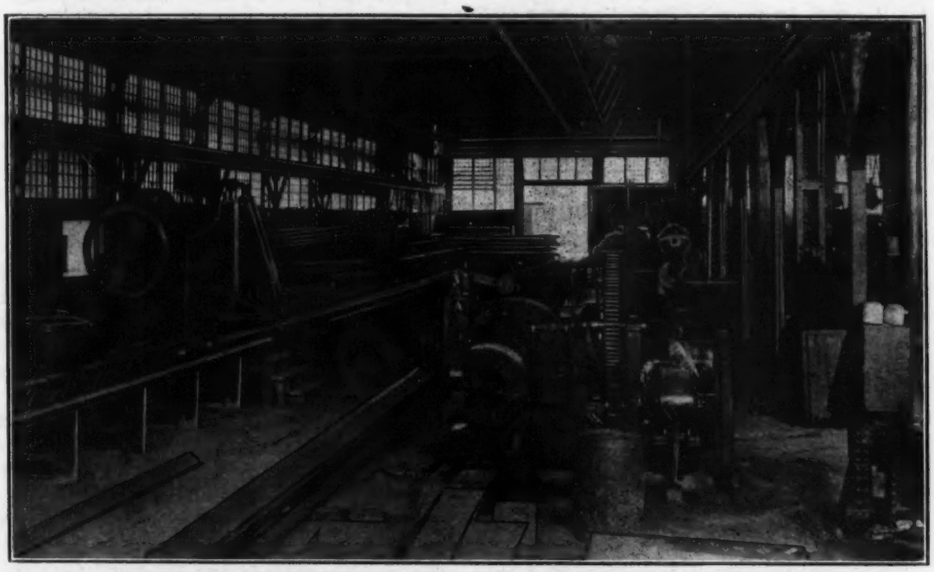


Fig. 6.—The Interior of No. 2 Shop of the Keystone Works.

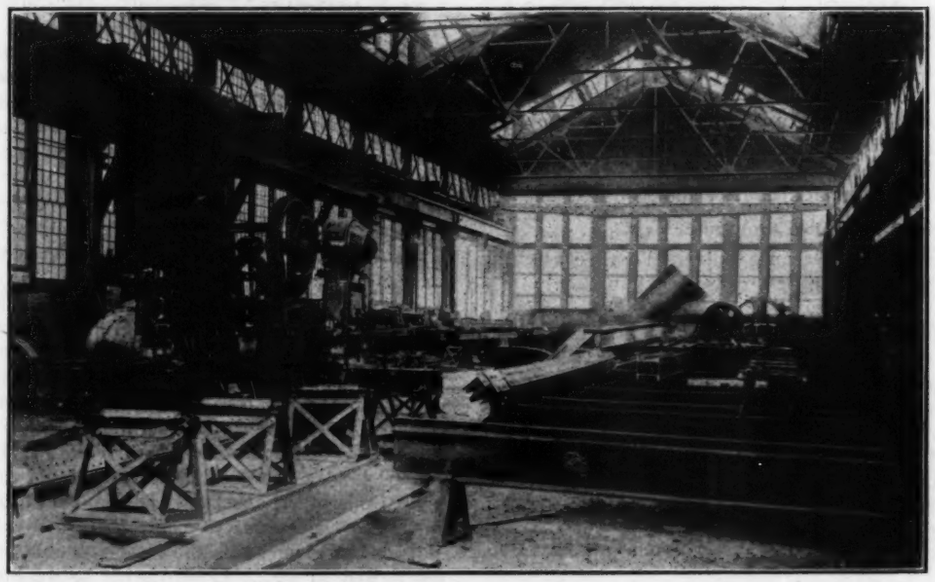
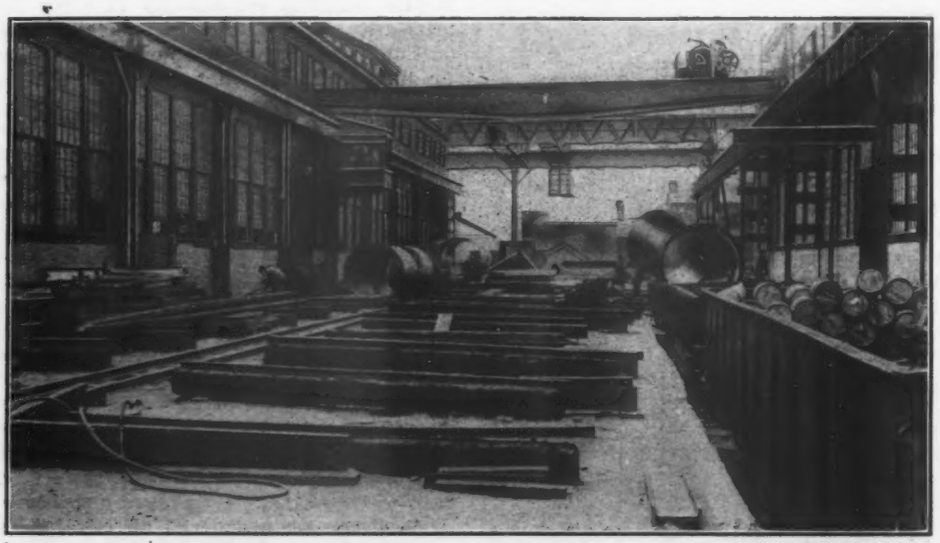


Fig. 7.—The Interior of No. 3 Shop of the Keystone Works.

The Short Weight Conference.—We have received, through the courtesy of J. L. Anthony, Weir Stove Company, Taunton, Mass., a printed copy of the complete "minutes of the meeting of the committee of representatives of consignors, transportation companies and consignees appointed by Henry A. Carpenter, chairman of the Weight Conference, to further consider the question of discrepancies between shipping and outturn weights of pig iron, coal and coke, in accordance with the resolution passed at the Philadelphia Conference February 5, 1908." This meeting was held at Philadelphia, March 18, 1908. The publication comprises 74 pages.

The receivers of the Pope Mfg. Company have been authorized by Vice Chancellor Howell, Newark, N. J., to make a payment of 25 per cent. on approved claims, the aggregate to be paid out amounting to $387,000. The payment, however, is to be deferred until the receivers shall have in hand $50,000 additional as proceeds of the sale of 1465 shares of stock of the American Wood Rim Company, which the vice chancellor ordered made.



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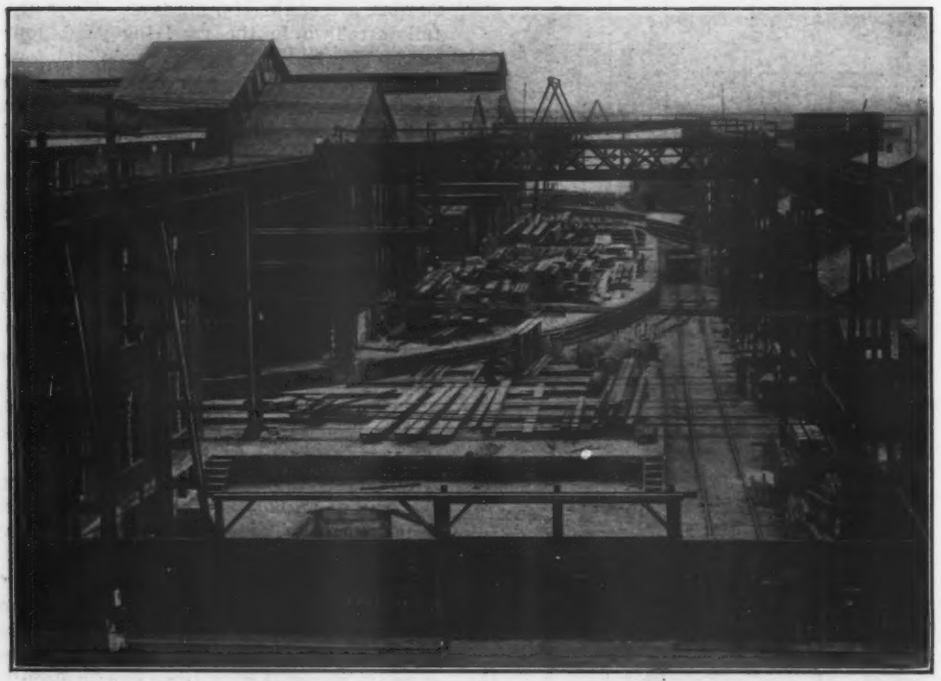

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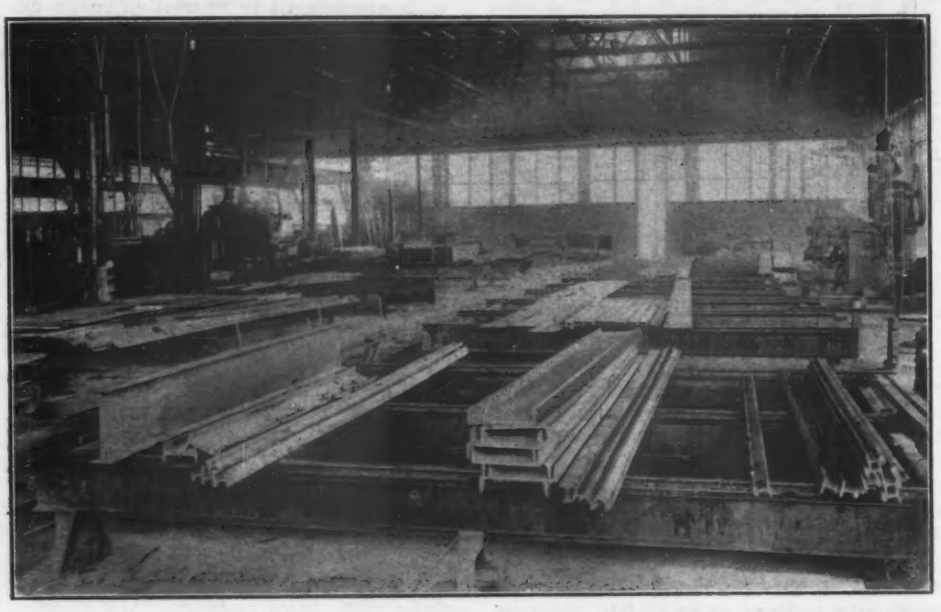

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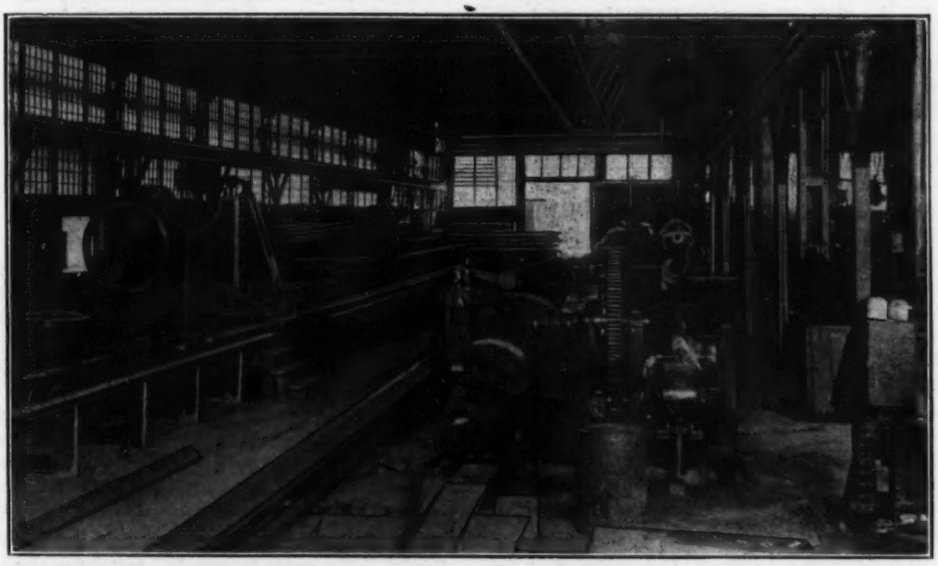
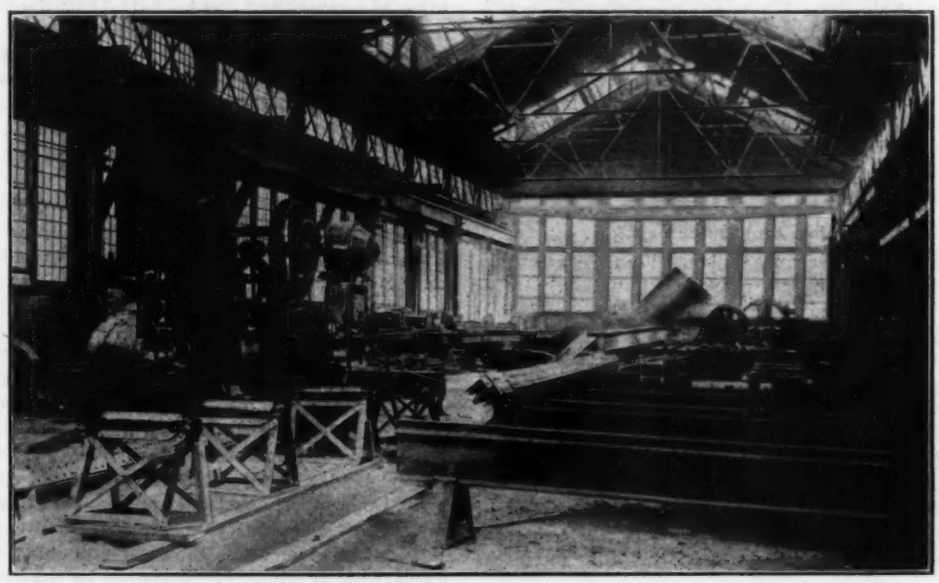


Fig. 6.—The Interior of No. 2 Shop of the Keystone Works.



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The Natural Wealth of the Land and Its Conservation.*

BY JAMES J. HILL.

The Limited Area of Unoccupied Land.

We now turn to the only remaining resource of man upon this earth, which is the soil itself. How are we caring for that, and what possibilities does it hold out to the people of future support? We are only beginning to feel the pressure upon the land. The whole interior of this continent, aggregating more than 500,000,000 acres, has been occupied by settlers within the last 50 years. What is there left for the next 50 years? Excluding arid and irrigable areas, the latter limited by nature, and barely enough of which could be made habitable in each year to furnish a farm for each immigrant family, the case stands as follows: In 1906 the total unappropriated public lands in the United States consisted of 792,000,000 acres. Of this area the divisions of Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico and Wyoming contained 195,700,000 acres of surveyed and 509,000,000 acres of unsurveyed land. Little of Alaska is fitted for general agriculture, while practically all of the rest is semi-arid land, available only for grazing or irrigation. We have, subtracting these totals, 50,000,000 acres of surveyed and 36,500,000 acres of unsurveyed land as our actual remaining stock. And 21,000,000 acres were disposed of in 1907. How long will the remainder last? No longer can we say that "Uncle Sam has land enough to give us all a farm."

Equally threatening is the change in quality. There are two ways in which the productive power of the earth is lessened; first by erosion and the sweeping away of the fertile surface into streams and thence to the sea, and second by exhaustion through wrong methods of cultivation. The former process has gone far. Thousands of acres in the East and South have been made unfit for tillage. North Carolina was, a century ago, one of the great agricultural States of the country and one of the wealthiest. To-day as you ride through the South you see everywhere land gullied by torrential rains, red and yellow clay banks exposed where once were fertile fields; and agriculture reduced because its main support has been washed away. Millions of acres, in places to the extent of one-tenth of the entire arable area, have been so injured that no industry and no care can restore them.

Soil Exhaustion and Deterioration.

Far more ruinous, because universal and continuing in its effects, is the process of soil exhaustion. It is creeping over the land from East to West. The abandoned farms that are now the playthings of the city's rich or the game preserves of patrons of sport, bear witness to the melancholy change. New Hampshire, Vermont, northern New York, show long lists of them. In western Massachusetts, which once supported a flourishing agriculture, farm properties are now for sale for half the cost of the improvements. Professor Carver of Harvard has declared after a personal examination of the country that "agriculture as an independent industry, able in itself to support a community, does not exist in the hilly parts of New England."

The same process of deterioration is effecting the farm lands of western New York, Ohio and Indiana. Where prices of farms should rise by increase of population, in many places they are falling. Between 1880 and 1900 the land values of Ohio shrank $60,000,000. Official investigation of two counties in central New York disclosed a condition of agricultural decay. In one, land was for sale for about the cost of improvements and 150 vacant houses were counted in a limited area. In the other, the population in 1905 was nearly 4000 less than in 1855.

Practically identical soil conditions exist in Maryland and Virginia, where lands sell at from $10 to $30 an acre. In a hearing before an industrial commission the chief of the Bureau of Soils of the Department of Agriculture said: "One of the most important causes of deterioration, and I think I should put this first of all, is the method and system of agriculture that prevails throughout these States. Unquestionably the soil has been abused." The richest region of the West is no more exempt than New England or the South. The soil of the West is being reduced in agricultural potency by exactly the same processes which have driven the farmer of the East, with all his advantage of nearness to markets, from the field.

The Yield Per Acre Falling.

Within the last 40 years a great part of the richest land in the country has been brought under cultivation. We should, therefore, in the same time, have raised proportionately the yield of our principal crops per acre; because the yield of old lands, if properly treated, tends to increase rather than diminish. The year 1906 was one of large crops and can scarcely be taken as a standard. We produced, for example, more corn that year than had ever been grown in the United States in a single year before. But the average yield per acre was less than it was in 1872. We are barely keeping the acre product stationary. The average wheat crop of the country now ranges from 12½ bushels in ordinary years to 15 bushels per acre in the best seasons. And so it is on down the line.

But the fact of soil waste becomes startlingly evident when we examine the record of some States where single cropping and other agricultural abuses have been prevalent. Take the case of wheat, the mainstay of single crop abuse. Many of us can remember when New York was the great wheat producing State of the Union. The average yield of wheat per acre in New York for the last 10 years was about 18 bushels. For the first five years of that 10-year period it was 18.4 bushels and for the last five 17.4 bushels. In the farther West, Kansas takes high rank as a wheat producer. Its average yield per acre for the last 10 years was 14.16 bushels. For the first five of those years it was 15.14 and for the last five 13.18. Up in the Northwest, Minnesota wheat has made a name all over the world. Her average yield per acre for the same 10 years was 12.96 bushels. For the first five years it was 13.12 and for the last five 12.8. We perceive here the working of a uniform law, independent of location, soil or climate. It is the law of a diminishing return due to soil destruction. Apply this to the country at large and it reduces agriculture to the condition of a bank whose depositors are steadily drawing out more money than they put in.

What is true in this instance is true of our agriculture as a whole. In no other important country in the world, with the exception of Russia, is the industry that must be the foundation of every State at so low an ebb as in our own. According to the last census, the average annual product per acre of the farms of the whole United States was worth 11.38. It is little more than a respectable rental in communities where the soil is properly cared for and made to give a reasonable return for cultivation. There were but two States in the Union whose total value of farm products was over $30 per acre of improved land. The great State of Illinois gave but $12.48 and Minnesota showed only $8.74. No discrimination attaches to these figures, where all are so much at fault. Nature has given to us the most valuable possession ever committed to man. It can never be duplicated, because there is none like it upon the face of the earth. And we are racking and impoverishing it exactly as we are felling the forests and rifling the mines. Our soil, once the envy of every other country, the attraction which draws millions of immigrants across the seas, gave an average yield for the whole United States during the 10 years beginning with 1896 of 13.5 bushels of wheat per acre. Austria and Hungary each produced over 17 bushels per acre, France 19.8, Germany 27.6 and the United Kingdom 32.2 bushels per acre. For the same decade our average yield of oats was less than 30 bushels, while Germany produced 46 and Great Britain 42. For barley the figures are 25, against 33 and 34.6; for rye, 15.4, against 24 for Germany and 26 for Ireland. In the United Kingdom, Belgium, the Netherlands and Denmark a yield of more than 30 bushels of wheat per acre has been the average for the past five years.

* From an address delivered at the Governors' Conference at the White House, Washington, D. C., May 13 to 15, 1908.

Robbing the Soil to Get Quick Returns.

When the most fertile land in the world produces so much less than that of poorer quality elsewhere, and this low yield shows a tendency to steady decline, the situation becomes clear. We are robbing the soil, in an effort to get the largest cash returns from each acre of ground in the shortest possible time and with the least possible labor. This soil is not mere dead matter, subject to any sort of treatment with impunity. Chemically, it contains elements which must be present in certain proportions for the support of vegetation. Physically, it is made up of matter which supplies the principal plant food. This food, with its chemical constituents in proper admixture, is furnished by the decomposition of organic matter and the disintegration of mineral matter that proceed together. Whatever disturbs either factor of the process, whatever takes out of the soil an excessive amount of one or more of the chemical elements upon which plant growth depends, ends in sterility. Any agricultural methods that move in this direction mean soil impoverishment; present returns at the cost of future loss; the exhaustion of the land, exactly as the animal system is enfeebled by lack of proper nourishment.

Our agricultural lands have been abused in two principal ways; first, by single cropping, and, second, by neglecting fertilization. It is fortunate for us that nature is slow to anger, and that we may arrest the consequence of this ruinous policy before it is too late. In all parts of the United States, with only isolated exceptions, the system of tillage has been to select the crop which would bring in most money at the current market rate to plant that year after year, and to move on to virgin fields as soon as the old farm rebelled by lowering the quality and quantity of its return. It is still the practice, although diversification of industry and rotation of crops have been urged for nearly a century and are to-day taught in every agricultural college in this country. The demonstration of the evils of single cropping is mathematical in its completeness. At the experiment station of the Agricultural College of the University of Minnesota they have maintained 44 experimental plots of ground, adjoining one another, and as nearly identical in soil, cultivation and care as scientific handling can make them. On these have been tried and compared different methods of crop rotation and fertilization, together with systems of single cropping. The results of 10 years' experiments are now available. On a tract of good ground sown continuously for 10 years to wheat, the average yield per acre for the first five years was 20.22 bushels and for the next five 16.92 bushels. Where corn was grown continuously on one plot, while on the plot beside it corn was planted but once in five years in a system of rotation, the average yield of the latter for the two years it was under corn was 48.2 bushels per acre. The plot where corn only was grown gave 20.8 bushels per acre for the first five and 11.1 bushels for the second of these years, an average of 16 bushels. The difference in average of these two plots was 32.2 bushels, or twice the total yield of the ground exhausted by the single crop system. The corn grown at the end of the 10 years was hardly hip high, the ears small and the grains light, but the cost of cultivation remained the same. And the same is true of every other grain or growth when raised continuously on land unfertilized.

We frequently hear it said that the reduction in yield is due to the wearing out of the soil as if it was a garment to be destroyed by the wearing. The fact is that soils either increase or maintain their productivity indefinitely under proper cultivation. If the earth, the great mother of human and animal life, is to "wear out," what is to become of the race?

Remedies are Rotation of Crops and Use of Fertilizers.

The two remedies are as well ascertained as is the evil. Rotation of crops and the use of fertilizers act as tonics upon the soil. We might expand our resources and add billions of dollars to our national wealth by conserving soil resources, instead of exhausting them as we have the forests and the contents of the mines. For there is good authority for the assertion that the farmer could take from the same area of ground in four years' grain crops out of a total of seven years as much as the whole seven now give him; leaving the products of the other three years when the land rested from grain as a clear profit due to better methods.

He can do far more than that by joining stock raising with grain raising. Nature has provided the cattle to go with the land. There is as much money in live stock as there is in grain. Looked at in any way, there is money in live stock; money for dairy products, money for beef, money for the annual increase, and most money of all for the next year's crop when every particle of manure is saved and applied to the land.

We need not consider at present really intensive farming, such as is done by market gardeners with high profit, or such culture as in France, in Holland, in Belgium and in the Island of Jersey produces financial returns per acre that seem almost beyond belief. What our people have to do is to cover less ground, cultivate smaller farms so as to make the most of them, instead of getting a scant and uncertain yield from several hundred acres, and raise productively by intelligent treatment to twice or three times its present level.

There is more money in this system. The net profit from an acre of wheat on rundown soils is very small; consequently decreasing the acreage of wheat under certain conditions will not materially decrease profits. Here are some reliable estimates. The price of wheat is given from the United States Department of Agriculture Year Book, average for 10 years:

Yield.—Bushels per acre.	Price per bushel.	Market value per acre.	Cost of production, including rent.	Net profit or loss.
20	$0.638	$12.76	$7.89	+$4.87
16	.638	10.21	7.89	+ 2.32
12	.638	7.66	7.89	— .23
10	.638	6.38	7.89	— 1.51
8	.638	5.10	7.89	— 2.79

From the above table it will be seen that as large a net profit is realized from one crop of 20 bushels per acre as from two crops of 16 bushels; and that a 12-bushel crop or less yields a net loss. It is a safe conclusion that 75 acres of land, growing a crop of clover every fourth year, will yield a larger net profit than will 100 acres sown to grain continually. A small field of 8 acres of clover in the Red River Valley last year yielded 42 bushels, worth over $60, per acre, from the sale of seed.

Commanding Importance of Agriculture.

I have dwelt upon the conservation of farm resources because of the commanding importance of this industry and because of its relation to our future. Nearly 36 per cent. of our people are engaged directly in agriculture. But all the rest depend upon it. In the last analysis, commerce, manufactures, our home market, every form of activity runs back to the bounty of the earth by which every worker, skilled and unskilled, must be fed and by which his wages are ultimately paid. The farm products of the United States in 1906 were valued at $6,794,000,000 and in 1907 at $7,412,000,000. All of our vast domestic commerce, equal in value to the foreign trade of all the nations combined, is supported and paid for by the land. Of our farm areas only one-half is improved. It does not produce one-half of what it could be made to yield; not by some complex system of intensive culture, but merely by ordinary care and industry intelligently applied. It is the capital upon which alone we can draw through all the future, but the amount of the draft that will be honored depends upon the care and intelligence given to its cultivation. Were any statesman to show us how to add $7,000,000,000 annually to our foreign trade, it would be the sensation of the hour. The way to do this in agriculture is open. Our share in the increase would not be the percentage of profit allowed by successful trading, but the entire capital sum. On the other side stands the fact that the unappropriated area suited to farm purposes is almost gone, and that we have been for the last century reducing the producing power of the country. Nowhere in the range of national purposes is the reward for conservation of a national resource so ample. Nowhere is the penalty of neglect so threatening.

By the fixed rate of increase in the past, we must count upon a population of over 200,000,000 in the United States in the year 1950. The annual increase from natural growth is about 1½ per cent. each year. Adding for

immigration only 750,000 a year, which is less than three-quarters of the figures reached in recent years, we shall have about 130,000,000 people in 1925, and at least 200,000,000 by the middle of the century. Where are they to go, how are they to be employed, how fed, how enabled to earn a living wage? The pressure of all the nations upon the waste places of the earth grows more intense as the last of them are occupied. We are approaching the point where all our wheat product will be needed for our own uses, and we shall cease to be an exporter of grain. There is still some room in Canada, but it will soon be filled. The relief will be but temporary. Our own people, whose mineral resources will by that time have greatly diminished, must find themselves thrown back upon the soil for a living. If continued abuse of the land should mark the next 50 years as it has the last, what must be our outlook?

We Cannot Look to Our Foreign Trade for Relief.

Even the unintelligent are now coming to understand that we cannot look to our foreign trade for relief from future embarrassment. Our total exports, about one-fourth in value of the products of our farms, consist to the extent of more than 70 per cent. of articles grown on the soil or directly sustained by it, such as live stock, or made from soil products, such as flour. Of all the materials used in manufacture in this country, 42 per cent. are furnished by the soil. We shall have less and less of this agricultural wealth to part with as population increases. And as to enlarging greatly our sale of manufactured products in the world's markets, it is mostly a dream. We cannot finally compete there, except in a few selected lines, without a material lowering of the wage scale at home and a change in the national standard of living which our people are not ready to accept without a struggle. When capital cannot find a profit there will be no money for the payrolls of an unprofitable business. Doubtless as we grow we shall buy more and sell more; but our main dependence half a century ahead must be upon ourselves. The nation can no more escape the operation of that law than can the man. It is time to set our house in order.

Not only the economic but the political future is involved. No people ever felt the want of work or the pinch of poverty for a long time without reaching out violent hands against their political institutions, believing that they might find in a change some relief from their distress. Although there have been moments of such restlessness in our country, the trial has never been so severe or so prolonged as to put us to the test. It is interesting that one of the ablest men in England during the last century, a historian of high merit, a statesman who saw active service and a profound student of men and things, put on record his prophecy of such a future ordeal. Writing to an American correspondent 50 years ago, Lord Macaulay used these words:

> As long as you have a boundless extent of fertile and unoccupied land your laboring population will be found more at ease than the laboring population of the Old World; but the time will come when wages will be as low and will fluctuate as much with you as they do with us. Then your institutions will be brought to the test. Distress everywhere makes the laborer mutinous and discontented and inclines him to listen with eagerness to agitators who tell him that it is a monstrous iniquity that one man should have a million and another cannot get a full meal. . . The day will come when the multitudes of people none of whom has had more than half a breakfast or expects to have more than half a dinner, will choose a legislature. Is it possible to doubt what sort of legislature will be chosen? . . . There will be, I fear, spoliation. The spoliation will increase the distress; the distress will produce fresh spoliation. . . . Either civilization or liberty will perish. Either some Cæsar or Napoleon will seize the reins of government with a strong hand, or your republic will be as fearfully plundered and laid waste by barbarians in the twentieth century as the Roman Empire in the fifth.

We need not accept this gloomy picture too literally, but we have been already sufficiently warned to prevent us from dismissing the subject as unworthy of attention. Every nation finds its hour of peril when there is no longer free access to the land, or when the land will no longer support the people. Disturbances within are more to be feared than attacks from without. Our Government is built upon the assumption of a fairly intelligent people, conservatively ruling their passions, with power to change their institutions when such change is generally desired. It would not be strange if they should in their desire for change attempt to pull down the pillars of their national temple. Far may this day be from us. But since the unnecessary destruction of our land will bring new conditions of danger, its conservation, its improvement to the highest point of productivity promised by scientific intelligence and practical experiment, appears to be a first command of any political economy worthy of the name.

Men Must Realize Their Duty Toward Coming Generations.

I have endeavored to outline some of the principal issues at stake in the better conservation of our national resources, and especially that one about which all the others revolve, and by whose fortunes we shall eventually stand or fall—the land itself. They are for us quite literally the issues of national existence. The era of unlimited expansion on every side, of having but to reach out and seize any desired good, ready provided for us by the hand that laid the foundations of the earth, is drawing to a close.

The first task, it seems to me, must be to force home the facts of the situation into the public consciousness; to make men realize their duty toward coming generations exactly as the father feels it a duty to see that his children do not suffer want. In a democracy this is a first essential. In other forms of government one or two great men may have power to correct mistakes and to put in motion wise policies that centuries do not unsettle. A part of the price of self-government is the acceptance of that high office and imperative duty as a whole by the people themselves. They must know, they must weigh, they must act. Only as they form and give effect to wise decisions can the nation go forward. And we should not be here to-day were it not that the principle of a conservation of national resources as the foremost and controlling policy of the United States henceforth is coming to be seen by many, and must be heartily accepted by all, as the first condition not only of continued material prosperity, but also of the perpetuation of free institutions and a government by the people. The work now being done by the Department of Agriculture and the agricultural colleges of the various States furnishes a broad and intelligent foundation upon which to build up a new era of national progress and prosperity. It calls for a wise, generous and continuing policy on the part of both Federal and State governments.

If this patriotic gospel is to make headway, it must be by just such organized missionary work as is to-day begun. It cannot go on and conquer if imposed from without. It must come to represent the fixed idea of the people's mind, their determination and their hope. It cannot be incorporated in our practical life by the dictum of any individual or any officer of nation or State in his official capacity. It needs the co-operation of all the influences, the help of every voice, the commendation of nation and State that has been the strength and inspiration of every worthy work on American soil for 120 years. We return, for our gathering in council and for our plan of action for the future, to the model given us by the fathers. State and nation are represented here, without jealousy or any ambition of superiority on either side, to apply to the consideration of our future, such co-operation as that out of which this nation was born and by which it has won to worthy manhood. Reviving the spirit of the days that created our Constitution, the days that carried us through civil conflict, the spirit by which all our enduring work in the world has been wrought, taking thought as Washington and Lincoln took thought, only for the highest good of all the people, we may, as a result of the deliberations held and the conclusions reached here to-day, give new meaning to our future; new luster to the ideal of a Republic of living federated States; shape anew the fortunes of this country, and enlarge the borders of hope for all mankind.

The Allis-Chalmers Company, Milwaukee, Wis., has opened an office at Birmingham, Ala., rooms 319-320 First National Bank Building. Seldon Jones has been placed in charge of this office as district manager.

The Acme Motor Driven Automatic Multiple Spindle Screw Machine.

The machine illustrated in Fig. 1, the No. 56 Acme automatic multiple spindle screw machine, equipped with motor drive, will be exhibited and demonstrated at the Railway Master Mechanics' and Master Car Builders' Convention at Atlantic City, June 17 to 24, by the National-Acme Mfg. Company, Cleveland, Ohio. Recent improvements in this size of machine provide for single belt drive, which is readily converted into a motor drive by substituting a gear, G, Fig 2, for the pulley, and placing the motor platform and motor on the machine as shown.

In Fig. 2 the back gears for the spindle driving shaft are shown at A, the clutch for changing speed at B, the chain driving the oil pump at C, the crank for operating by hand at D, the hand lever controlling the clutch B at E, the change gears at F, the gear substituted for the pulley used on single belt drive at G, and the free wheel at H.

There are several advantages afforded by the single belt drive and the related changes. The speed ratio between the cam shaft and the spindle drive shaft is constant, the drive being positive, which eliminates accidents to tools from belt slips. Only one belt at the most is used, consequently belt troubles are minimized and the countershaft simplified; with motor drive both are entirely avoided. The output of the machine is increased because the positive control of the change of speed for the tools allows the maximum use of the fast speed. In case of accident or stopping for any cause manipulating the lever E, Fig. 2, immediately releases the cam shaft mechanism. It is possible to move tools intermittently when setting up or testing, by using this same lever which controls the clutch B. Cranking by hand is easier because the transmission mechanism is cut loose entirely by means of the free wheel H. The time necessary for changing the speed of the cam shaft is considerably less because of the more convenient location of the change gears F. The oil pump is driven at a constant speed, and the control of the hand and power movements of the cam shaft mechanism as well as the flow of oil is brought within easy reach of the operator while in position to observe the action of the tools.

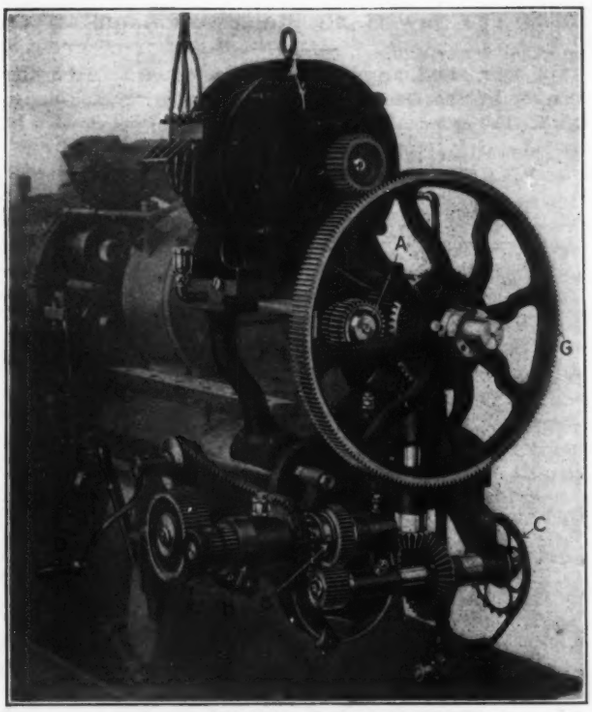


Fig. 2.—Detail of the Drive with Gear Covers Removed.

The system of gearing shown is so designed that it is practically noiseless. These changes in the mechanism of the machine make the work of operating it much lighter than formerly.

The company is in position to supply the No. 56 (2¼ in.) machines equipped for single belt drive or for motor drive, and will furnish the motor or any standard direct or alternating current motor can be applied by the purchaser without altering it in the slightest. The size of the motor required varies from 3 to 5 hp., depending upon the class of work for which the machine is to be used.

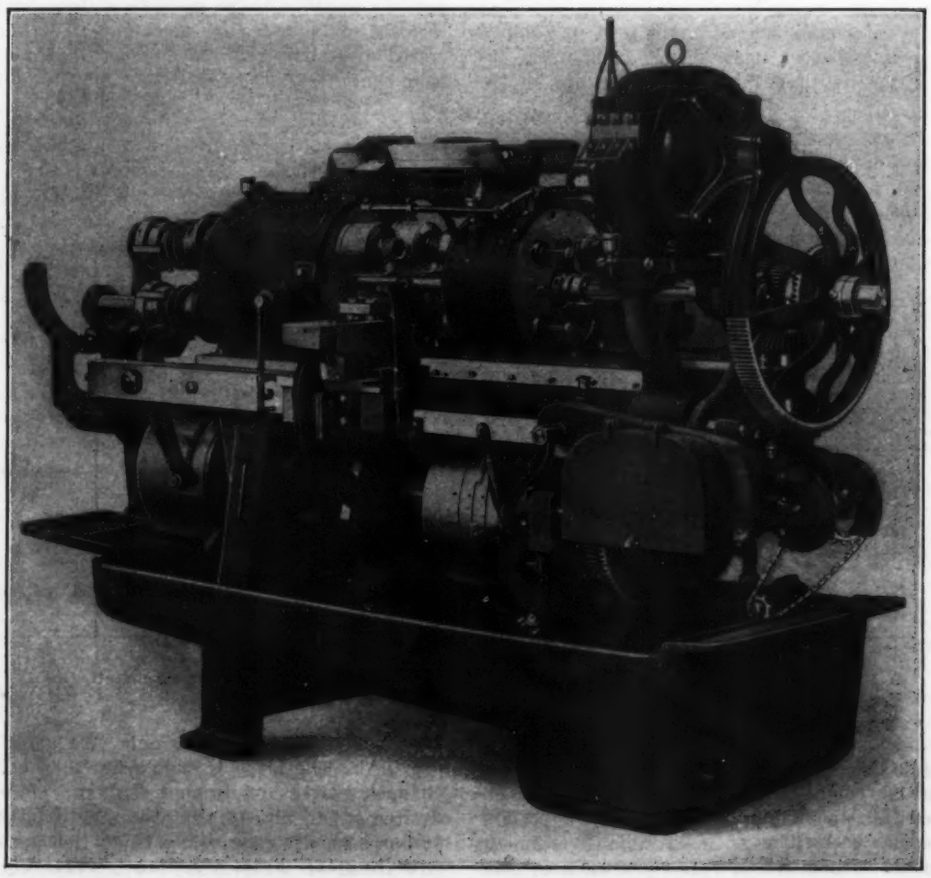
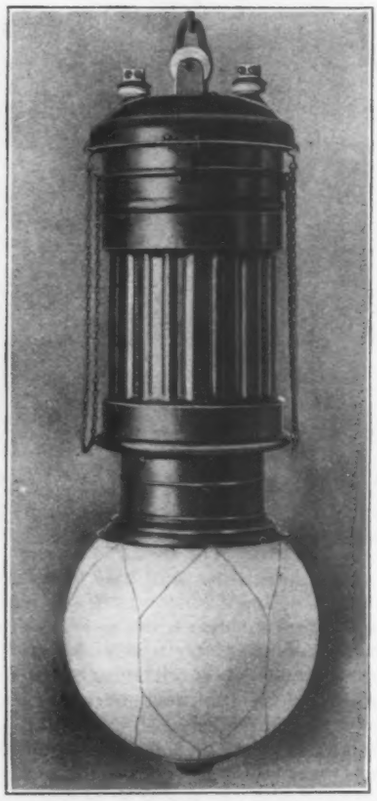


Fig. 1.—The No. 56 Automatic Multiple-Spindle Screw Machine, Equipped with Motor Drive, Built by the National-Acme Mfg. Company, Cleveland, Ohio.

The New G. E. Flame Arc Lamp.

A new flame arc lamp has just been placed on the market by the General Electric Company, Schenectady, N. Y. The external appearance of this lamp is similar to



The New Flame Arc Lamp Made by the General Electric Company, Schenectady, N. Y.

the G. I. enclosed lamp, the casing being drawn seamless from either sheet copper or steel. The standard finish for the copper casing is antique and for the steel bright japan. This lamp has no chain feed or complicated escapement and clock mechanism. It is of the inclined carbon type, with nothing below the arc to obstruct the light, and both carbons feed by gravity simultaneously, while the regulation of the arc is accomplished by the lateral movement of the carbons. When the casing is lowered into the trimming position every part of the lamp becomes accessible.

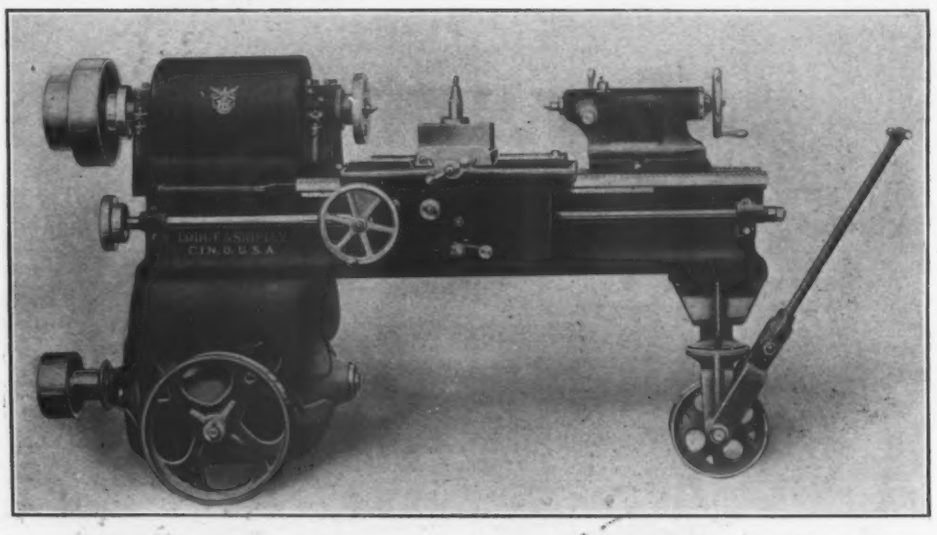
A serviceable economizer of refractory material surrounds the points of the carbons just above the arc to prevent the washing of the carbon ends, and to steady the arc from the effect of air currents as far as possible. A blow magnet is so situated with relation to the arc that it performs the double function of keeping the arc steadily fan-shaped at the carbon tips, and also totally extinguishes the arc if it approaches dangerously near to the economizer. The economizer, therefore, is well protected from burn out and should last indefinitely. A heavy baffle plate of insulating material is provided just above the economizer, effectually preventing any appreciable amount of the products of the arc from depositing on the parts of the mechanism. During operation the lower surface of the bottom plate of the lamp and of the economizer becomes coated with white deposit from the arc which acts as an excellent reflector for the upward light from the arc.

These lamps are designed to burn two in series or singly across 100 to 125-volt direct or alternating current circuits. They can be used on any frequency between 40 and 140 cycles. The lamps may be wound for either 8, 10 or 12 amperes, the latter current being considered standard. All lamps are equipped with light opal glabes. On each trimming the lamps burn about 12 hours on indoor circuits and between 10 and 11 hours on outdoor circuits. The simple construction, high efficiency, and the volume of illumination obtained, especially adapt these lamps to the lighting of foundries, mills, wharves, warehouses, and erecting shops and similar places.

A Lodge & Shipley Portable Lathe.

The illustration shows a 16-in. swing portable lathe built by the Lodge & Shipley Machine Tool Company, Cincinnati, O. It is intended for use in fitting frame bolts and turning up studs, &c., in locomotive repair shops, and doing the various odd jobs which come up on the assembling floor of shops manufacturing heavy machinery, where otherwise it would be necessary to carry the parts to be fitted from the erecting floor some distance to the lathe department and back again.

As seen in the engraving, the lathe bed is mounted upon three wheels and on a fairly level floor may be pulled about by one man. A 2½ hp. constant speed, fully inclosed motor is suspended under the headstock and bolted to a two-step cone pulley mounted upon the back gear shaft. For the sake of simplicity, and because the range of work is limited, only two speed changes are provided. The lathe is supplied with a belt feed of two changes, power longitudinal feed and plain rest. When desired it can also be supplied with a taper attachment. It has been designed solely to do the one class of work with the greatest rapidity. When portability is not desired it can be furnished with legs instead of the wheels.



A 16-In. Portable Lathe Built by the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio.

The Burke Cold Saw.

Completeness without complication and moderate cost were the two main objects in designing the cold saw illustrated in Fig. 1. Both of these are claimed by the builder, the Burke Machinery Company, Cleveland, Ohio, to have been accompliished. It is possible with this machine to saw iron stock at any angle, to remove sprues from castings, and cut many kinds of work that cannot be handled on machines of other constructions. Because of the company's special equipment for the manufacture of the saws and the anticipated demand for them it will be able to sell them at a relatively low price.

The saw is mounted on a carriage which travels in guides in the main frame. This carriage is shown removed from the machine in Fig. 2. The saw itself is bolted directly to a worm wheel which is held in place

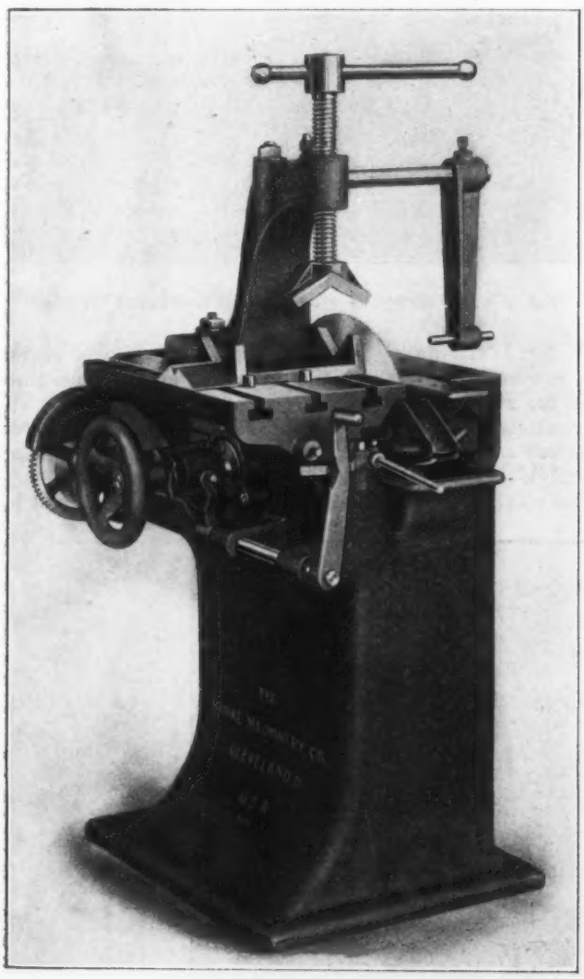


Fig. 1.—The New Cold Saw Built by the Burke Machinery Company, Cleveland, Ohio.

by the loose shaft B and is driven by a worm. This manner of driving eliminates back lash and the torsion strain common on arbor driven saws having a bearing between the driving worm wheel and the saw. The worm and worm wheel are enclosed to prevent chips from getting into them. The worm shaft is keyed with freedom to slide in a gear which is mounted on the rear of the frame and meshes a pinion on one end of the shaft carrying the driving pulley. On the front of the saw carriage is the hardened steel casting A, which acts as a guide plate for the saw and at the same time as a stripper to carry away the chips from the saw.

The pinion on the driving pulley shaft also actuates the feed of the saw carriage through a system of gearing driving a worm shaft on the outside of the machine. The worm on this shaft engages a worm wheel having one member of a jaw clutch cast on its side. The other member of the clutch is engaged with the first by sliding and is splined to a cross shaft, the inner end of which has a pinion meshing a rack secured to the lower side of the saw carriage. The clutch is manipulated by a lever on the front of the machine and is normally held disengaged by a spring. When the saw is running and the lever is operated to engage the clutch, the lever is retained by a latch on the front of the machine. An adjustable rod passing through one end of this latch may be set to trip the latter at any desired point and thus stop the feed of the carriage by the contact of the carriage with the end of the rod. To protect the feeding mechanism and the saw blade from overcrowding there is a yielding connection in the train. Between the driving pinion and the feed worm gear shaft there is a gear held between leather lined flanges. A spring, the tension of which is regulated by a hand nut, clamps the flanges to the gear, thus providing a friction drive. With the friction clamped tight and by using a fine tooth saw the machine can be successfully used for sawing tubing. This is largely because of the type of saw drive employed. Attention has been paid to material and workmanship throughout. The worm wheels are made of phosphor bronze, and wherever steel castings are advisable in the construction of the machine they are used.

The machine illustrated will cut 3-in. round stock or 5-in. I-beams, its maximum capacity being a 3x5 in. section. The saw carriage has a travel of 9 in., so that flat stock up to 9 in. wide may be cut. For holding small round or square stock a guide block is furnished which is

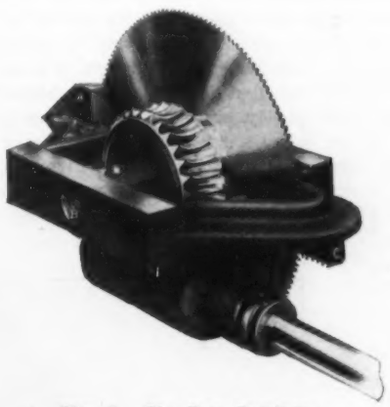


Fig. 2.—The Saw Carriage.

secured to the T-slots in the top of the table. A removable screw clamp holds the work in the trough of this block. When these attachments are taken off from the table a large clamping surface is left to which various shaped pieces of work may be attached, as no part of the machine except the saw projects above this table. The saw carriage travels over an oil pan cast in the frame of the machine, and the saw blade dips into the oil to a depth of 1 in., so that lubricant is carried to the work.

The company is also preparing for the market a larger saw, carrying a 20-in. blade and having a capacity for 5½-in. rounds or 12-in. I-beams. This saw will have a clamping table of 14 x 34 in. In many cases there is need of a saw for a variety of general work, including the cutting of tool steel, machinery steel, cast iron and brass, &c. For such conditions a cone pulley and countershaft can be supplied for the drive instead of the standard tight and loose pulleys mounted directly on the machine. The speed of the saw can then be varied to suit different materials.

The *Locomotive* refers to the desirability of stamping boiler tubes with the manufacturer's name, so that after having been in service for some time it might still be possible to know their origin and the degree of excellence assigned them by their makers. The case is cited of a new 4-in. tube, represented to be of first quality, from which it was necessary to cut off 6 in. before it was set in the boiler to replace a ruptured tube. While the cut was being made the tube split apart at the weld for some distance. Examination of the end of the tube showed that the weld had been made by merely butting the edges of the tube together, without any attempt at scarfing.

The New Ingersoll Horizontal and Vertical Miller.

Combined horizontal and vertical spindle milling machines, having the planer type of bed and housings, are familiar products of the Ingersoll Milling Machine Company, Rockford, Ill., but the machine illustrated is a departure for this company in that it follows the knee type construction common to the ordinary horizontal or vertical milling machines. For heavy milling machines, which this company has made a specialty of for over 20 years, it is preferable to support the work on a solid base resting on the floor, and to adjust and feed the spindles to the work by carrying them on a cross rail having vertical adjustment. This new machine reverses the conditions, the spindles being rigidly supported by the main frame column and the work carried on a knee capable of vertical adjustment. This machine is still, however, to be regarded as one adapted to heavy work, as its appearance indicates, and in a sense it occupies a position between either the horizontal or vertical spindle milling machines built for medium and light work by other makers and the extremely heavy machines made by the Ingersoll Company. Either spindle can be used independently or both simultaneously.

There are a number of mechanical features in the machine which are either unusual or special in their particular application. It will probably be interesting then to first trace through the operation by referring to Figs. 1 and 2 herewith. The power is transmitted to the machine by belt through pulley *a*, Fig. 2, or by a motor connected to a gear or sprocket substituted for the pulley. The pulley or gear, as the case may be, is mounted on the same shaft with gears *b* and *c*, which, alternately meshed with gears *d* or *e*, give two series of speeds to both spindles in the same ratio. The lever A shown on Fig. 1 shifts the gears *b* and *c* of Fig. 2 to their respective positions.

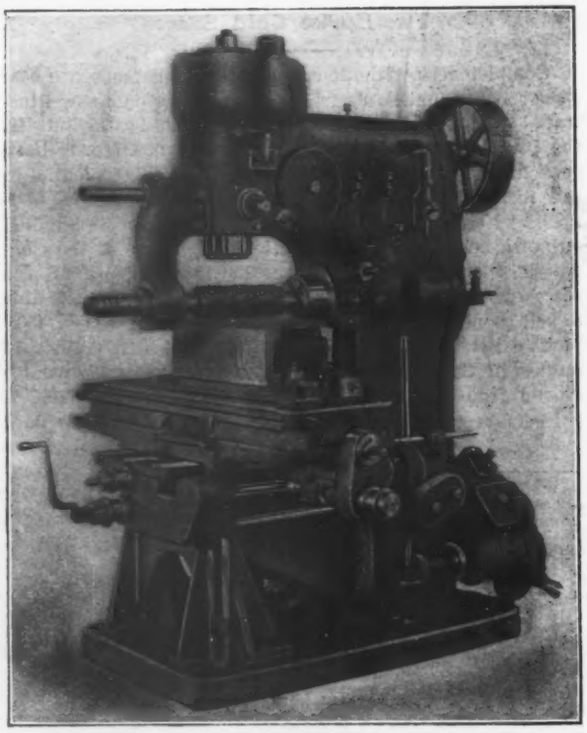


Fig. 2.—The Machine as Set Up for Horizontal Milling.

The horizontal spindle is rotated by a train of gears, *f*, *g*, *h* and *i*, or *f*, *g*, *j* and *k*, depending upon the position of the sleeve clutch which engages the gears *i* or *k* alternately to their shaft. The sleeve of this clutch is moved to its respective positions by lever B, shown on Fig. 1. The vertical spindle is rotated from the shaft carrying the gears *d* and *e* through gears *l*, *m*, *n* and *o*,

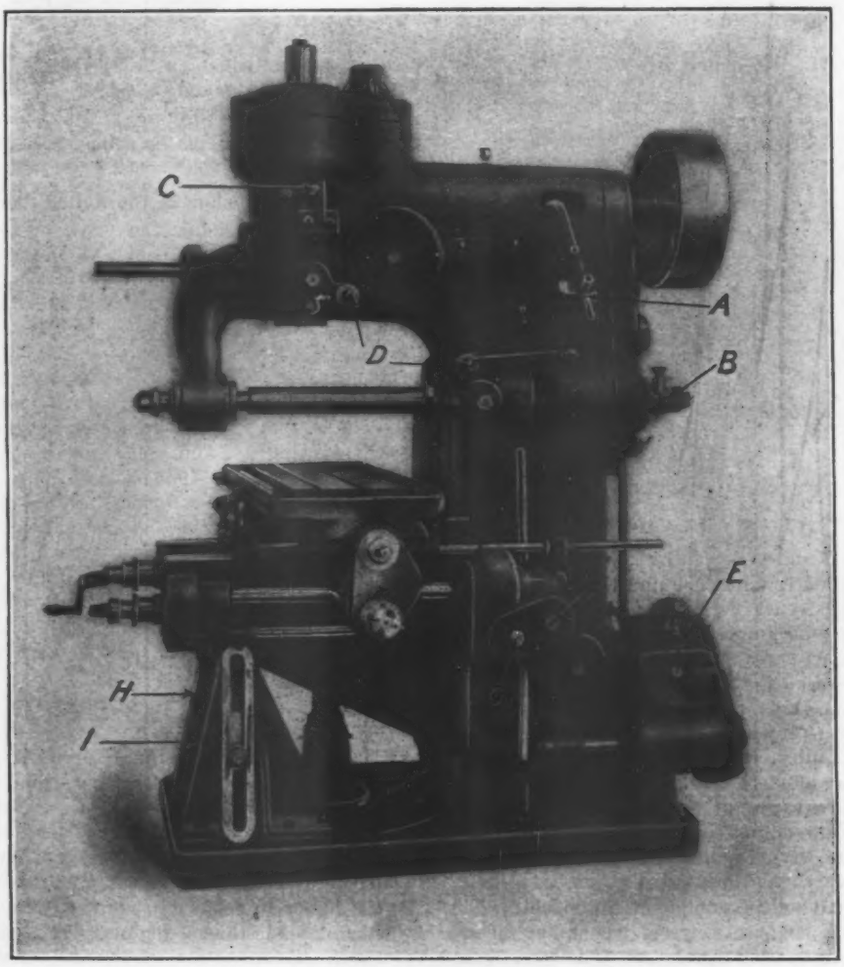


Fig. 1.—The New Knee Type Combined Horizontal and Vertical Spindle Milling Machine Built by the Ingersoll Milling Machine Company, Rockford, Ill.

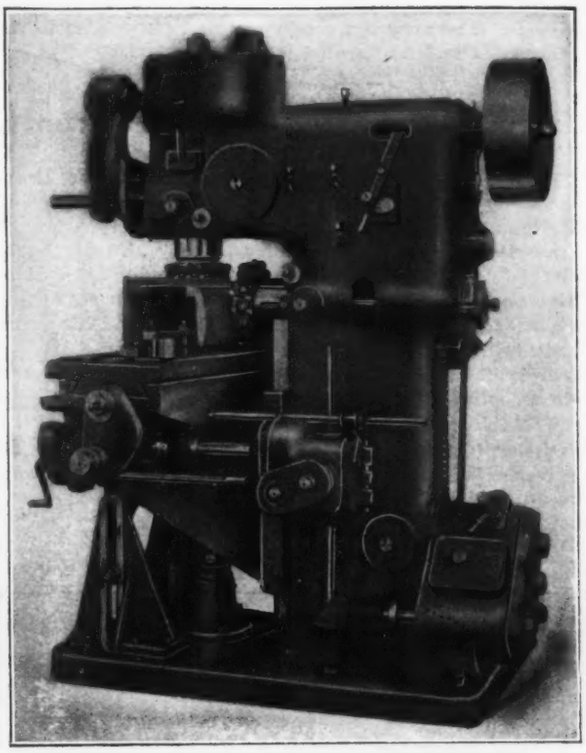


Fig. 3.—Both Spindles Simultaneously Operating Face Mills.

or through gears *l*, *m*, *p* and *q*, depending upon the position of the sleeve clutch which engages the gears *o* or *q*. This sleeve is moved to its respective positions by the lever C, shown on Fig. 1.

The feed is driven by a sprocket wheel on the main drive shaft connected by a chain to a sprocket wheel, *s*, in the feed box. This sprocket wheel is yieldingly secured to the feed works by being mounted on two reverse cones, one of which is keyed to the shaft, while the other is splined to the hub of the first cone. A coil spring, the tension of which is adjustable by a nut, tends to force the cones together, binding the sprocket to the shaft. This arrangement reduces the shock when changing feed clutches while the machine is in operation. Upon the shaft of the sprocket wheel *s* are mounted two gears of different ratios, which give two speeds to a cone of gears mounted on the shaft *t*. The change is made by sliding the clutch on the sprocket wheel shaft through the lever E of Fig. 1. The lever *u*, Fig. 2, carries a trunnion gear which can be meshed with any of the eight gears in the cone, giving 16 feed changes instantly and independent of the spindle speed changes. The double clutch *v* gives feed reverse, and is operated by table dogs for longitudinal feed, or saddle dogs for cross feed, and also by the hand lever *w*. Pick-off gears F and G, Fig. 1, when reversed give table feeds up to 34 in. per minute.

The braces H and I support the knee and make a very rigid construction. The machine throughout is of correspondingly substantial design. It is easy to manipulate, and is intended to be a general utility machine, to be able to take the heaviest cuts without injury from the strain or giving evidence of chatter in the work. Figs. 3 and 4 show the machine performing typical operations and are suggestive of its powerfulness.

The machine column is 84 in. high over all and has a section 22 in. deep by 18 in. wide. The knee is 36 in. long and has a bearing on the column 28 in. deep by 22 in. wide. The saddle carrying the table is 60 in. long, 19 in. wide and 5 in. thick, and has a top working surface 48 in. long by 18 in. wide, which contains three T-slots cut from the solid and drilled pin holes. The spindles are 4½ in. in diameter in the bearings and are made of hammered open hearth crucible steel. The wear of the spindles is taken up by nuts which adjust cones rotated with the spindles by splines. These run in phosphor bronze boxes. The spindles are carried by sleeves *r*, Fig. 2, which are 7½ in. in diameter by 12 in. long, and have rack teeth engaged by pinions, with squared ends, D, Fig. 1, to take a crank handle. The adjustment is 6 in., and is made with reference to graduated scales. The

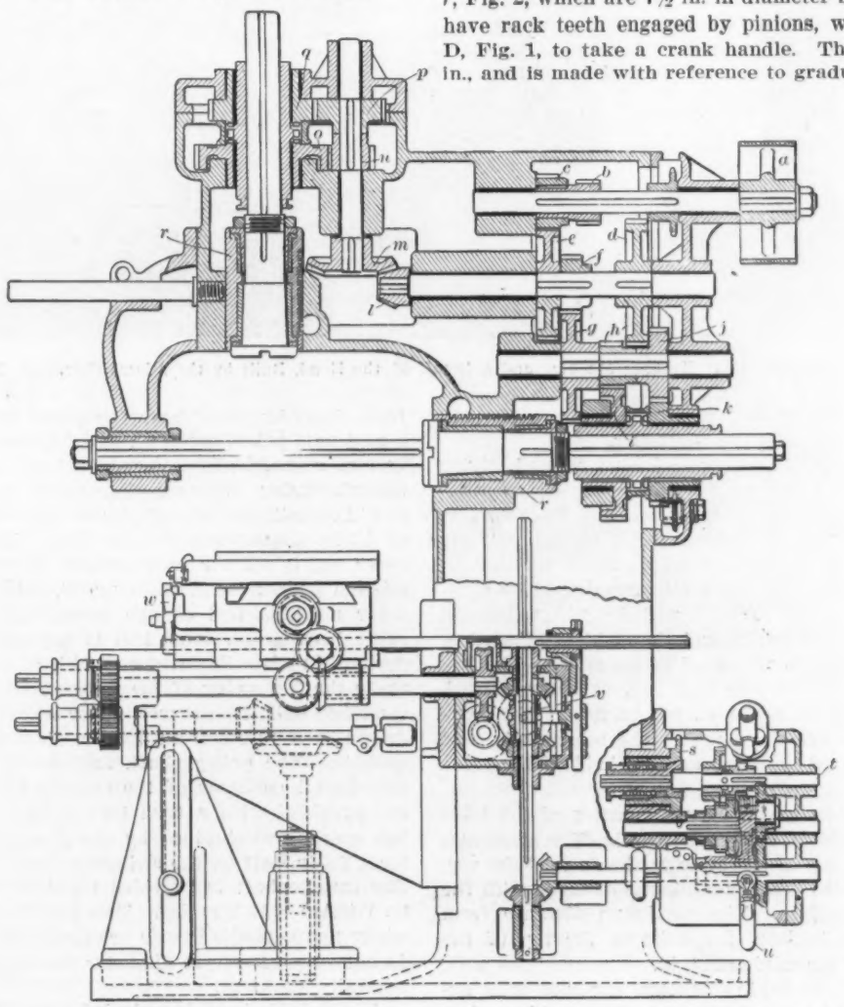


Fig. 4.—A Transverse Section of the New Ingersoll Combined Horizontal and Vertical Spindle Milling Machine.

arbor is 2 in. in diameter and is driven by a clutch on the end of the spindle.

The larger of the two spindle gears mounted on each spindle, and referred to before, are 13 in. pitch diameter, 4 pitch, 2½ in. face, and the smaller 10¼ in. pitch diameter, 4 pitch, 2½ in. face. As was also previously explained, there are two mechanical changes in the drive gearing in the column, affecting both spindles in the same ratio. These, with two independent changes at the spindles, give four mechanical changes in the machine. When the machine is to be belt driven a two-speed countershaft is furnished with it, running at 200 and 400 rev. per min., which again doubles the spindle speeds, making eight in all. These are 15, 23, 30, 33, 46, 66 and 100 rev. per min. If the machine is to be motor driven the motor is mounted on the top of the column and connected to the driving shaft by a silent chain and sprocket wheels. The motor should be of 10-hp. capacity, of variable speed type, with a 2 to 1 range, including speeds from about 500 to 1000 rev. per min., in which case the spindle speeds will range from 15 to 100 rev. per min., as in the belt driven machines. There will be two mechanical changes within these limits, and the number of intermediate speeds will depend upon the steps on the controller.

There are 16 table feeds for each cutter speed, giving feeds of from 0.48 to 8.9 in. per min. when the countershaft is running at 200 rev. per min., and from 0.97 to 17.8 when the countershaft is running at 400 rev. per min. If the machine is motor driven there will be the same ranges of feeds with the motor running at its slowest and highest speeds; there will be 14 mechanical changes between these limits, and they will be effected in direct ratio according to the speed of the motor. The two pick-off gears on the reverse feed box, as before stated, give feeds running up to 34 in. per minute. The cross feeds of the knee are the same as the table feeds, and the vertical feeds of the knee are one-half of the table feeds.

The greatest distance between the center of the table and the column is 24 in. and the least 8 in. The maximum distance from the top of the table to the face of the vertical spindle is 26 in., and the minimum distance with the sleeve extended is 2 in. The maximum distance from the center of the horizontal spindle to the top of the table is 16 in and the minimum 0 in.

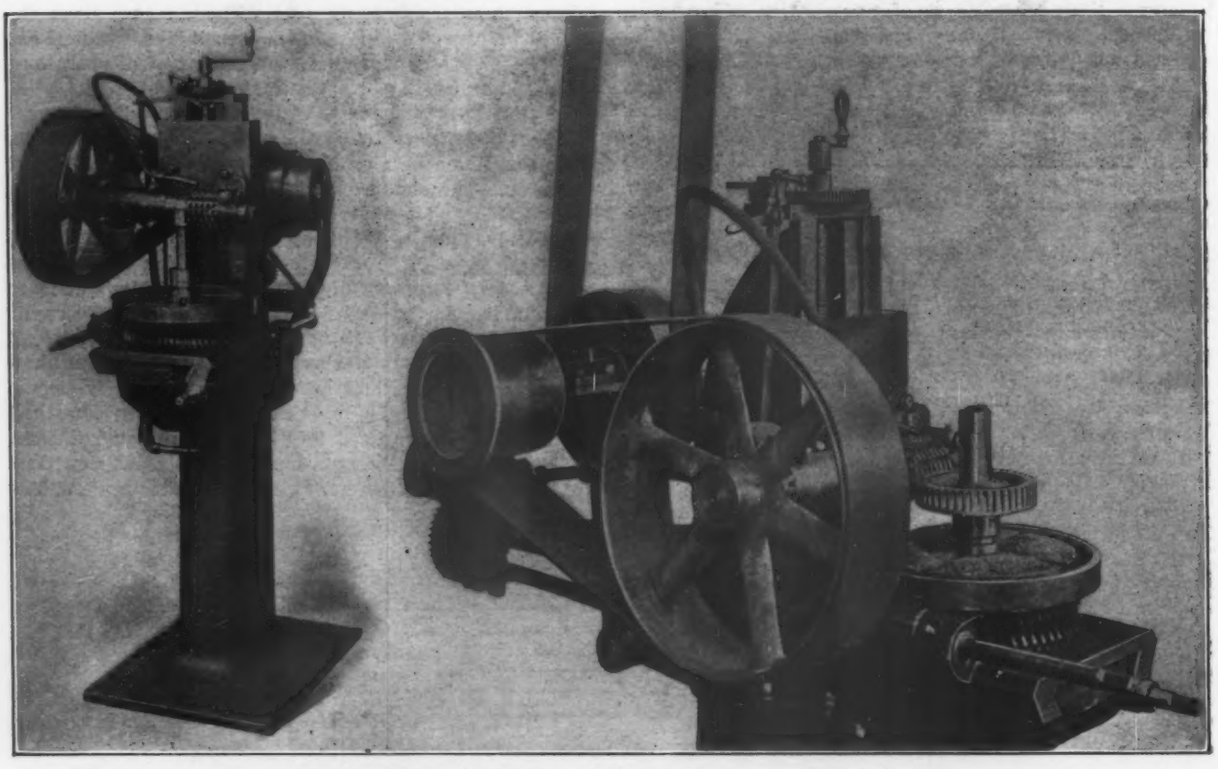
A circular table 16 in. in diameter, equipped with automatic stops, can be furnished with the machine when desired. Without the circular table the machine weighs 9700 lb. The floor space occupied at right angles to the table is 81 in. and parallel with the table 110 in.

The Farwell Automatic Gear Hobber.

The hobbing process of cutting spur gears has many advantages that are responsible for its increasing popularity, and gear hobbing machines are likely to be as extensively used in this country as they already are in Germany. Milling one tooth at a time is faster than planing because there is only one idle return stroke for each tooth, but hobbing is still faster, the cutting being continuous from start to finish of the gear, and limited only by the strength of the hob teeth. The accuracy and the smooth and quiet running qualities of gears cut on a gear hobbing machine are declared to be equal, if not superior, to those of a gear formed on a gear generating planer. With both, theoretically correct tooth curves result, and the teeth are uniform in thickness and contour.

The gear hobbing machine illustrated is one of simple form, built by the Adams Company, Dubuque, Iowa, as a moderate priced machine, suitable for cutting accurately and economically a large part of the gears used in manufacturing. When equipped with the necessary hobs it will cut all sizes and pitches of gears up to its capacity of 12 in. diameter and 6 in. face. This capacity will cover nearly all the requirements for automobile transmission gears; lathe, boring mill, milling machine and other machine tool change gears, and drill press and other back gears. One hob is required for each pitch desired, but it will cut gears with any number of teeth up to the full swing of the machine table (12 in.). The same hob will also cut worm gear wheels. The spindle is driven by a 4-in. belt on a 15-in. diameter pulley from a swinging cone pulley shaft, and the driven belt is kept taut in all positions of the spindle head by a distance rod provided with a turn buckle for adjusting. Three hob speeds are obtained by the three step cone pulleys for a 2½-in. belt on the swinging shaft and countershaft. The countershaft is provided regularly with one 4 x 10 in. friction clutch pulley. Two pulleys may be provided where more spindle speeds are desirable, but as the hobs do not vary greatly in diameter three spindle speeds are generally sufficient.

The spindle head is swiveled upon the saddle so that the hob may be set at the proper angle for cutting spur



The Farwell Automatic Gear Hobbing Machine and a Detail of the Head, Built by the Adams Company, Dubuque, Iowa.

gears with different pitches or for cutting worm gears. The saddle is gibbed to slide on the column for providing vertical feed.

The hobs for cutting spur gears are regularly right hand, single thread, 3 in. in diameter, 3 in. long, with 1¼-in. arbor hole and ¼-in. keyway. Other sizes, of course, may be used. The hobs may be moved lengthwise so the entire length of hob can be used before requiring sharpening.

The table revolves on a wide angular surface that gives the table greater rigidity. A small plunger pump forces a stream of lubricant upon the cutter and work when desired. The knee that supports the table saddle is hollow and forms a tank or reservoir for the lubricant. Holes through the table hub conduct the lubricant back to this reservoir. The table is revolved at the proper speed (varying according to number of teeth in the gear to be cut) by means of one pair of bevel gears at the spindle head, one worm at the table, and one pair of spur gears connected to a bevel gear by a universal jointed rod. As there are only a few joints and all gears and shafts are large, a steady positive drive of the table in unison with the cutter is insured, which is essential for accurate work. Usually only one of the spur gears is changed when the number of teeth to be cut is changed.

The vertical feed is by means of a pawl and ratchet operated through a reducing gear by an eccentric on the worm shaft. The feed may be changed without stopping the machine by shifting the button on the bell crank at the top of the machine. A trip automatically stops this feed when the hob has finished the gear. No attention is required by the operator other than putting on blanks and taking off finished gears, hence one operator may run several machines or attend this gear cutting machine while operating other tools.

A rigid stop is provided, against which the table saddle may be run, to give the proper depth to the teeth. Instead of setting this stop by micrometer graduations, which requires considerable care, a hardened steel gauge is provided which is of a thickness equal to the depth of teeth of the pitch desired. To set the stop, the saddle is advanced until the blank contacts with the hob. The stop is then screwed up against the gauge block. When the gauge block is removed and the table is advanced to the stop, the correct depth is obtained. After the stop is set for a given diameter any number of gears of the same size can be cut to the proper depth by feeding the table each time to this rigid stop. Even a careless operator is not so likely to spoil work as when using a micrometer depth gauge.

The spindle is 1¾ in. in diameter, and has a bearing 6¾ in. long, with provision for taking up wear and end play, and an outer bearing 1¾ in. long and 1⅝ in. in diameter. These supports for the cutter hob are very rigid, and overhang only enough to swing a 3-in. hob. The saddle is heavily gibbed to the housing and has a bearing on it 8½ in. long. The swivel head is 8½ in. in diameter, and is secured to the saddle by three T head bolts. The head is counterbalanced by weights in the column. The table is supported and revolves on a cone surface 9½ in. in diameter at the outer edge and 2½ in. wide. In addition to this there is a center hub bearing 3½ in. in diameter extending through the saddle with an adjusting ring nut below. The table saddle is 12½ in. long, and is strongly gibbed to the knee, which is 8 in. wide. The feed screws for the head and for the table are both ⅞ in. in diameter and square threaded. The stop screw is ¾ in. in diameter, and has hardened steel contact points in the screw end and in the saddle. The countershaft furnished has 10 in. pressed steel hangers, a 1 7-16 in. shaft, 4 x 10 in. clutch pulley, and a three-step cone pulley for a 2½-in. belt. It is intended to run at 130 rev. per min.

Purdue University, Lafayette, Ind., has shipped to the University of Illinois, Champaign, Ill., a Purdue University impact machine, used for testing reinforced concrete beams. It is the third of its kind in existence. Of the others, one is at Purdue and the second in California. The machine has a 10-ft. bedplate, with two upright guides for weights of 50, 100, 250 and 500 lb., which may be dropped from a hight of 6 ft. An ironclad magnet attached to a chain is raised and lowered by a motor on top of the guides, lifting the weights to the proper hight, when the shutting off of the current allows them to drop. The machine weighs 8000 lb. It is made in the workshops of Purdue University. The design and plans were made by Prof. Wm. K. Hatt, head of the School of Civil Engineering, and Prof. W. P. Turner, of the Mechanical Engineering School.

The Coates Unit-Link Flexible Shaft.

The Coates Clipper Company, Worcester, Mass., has brought out an entirely new flexible shaft in which the unit link idea has been developed, and which is so designed that much greater efficiency is obtainable than in the older type, especially when running at low speeds.

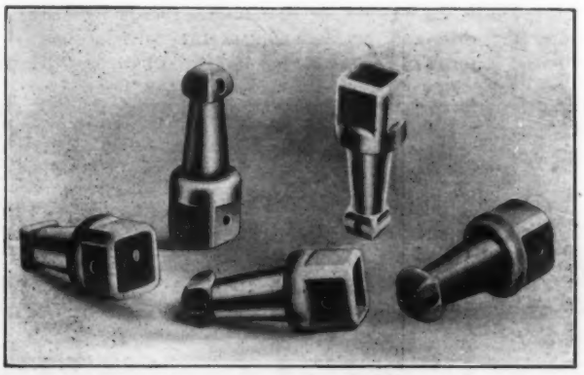


Fig. 1.—Unassembled Links of the New Flexible Shaft Made by the Coates Clipper Company, Worcester, Mass.

The simplicity of the new shaft is a marked characteristic. In the older design each unit had eight parts; the new is one solid piece, with a pin, the only function of which is to keep the units together; it takes no part whatever in the drive, nor is there any tension upon it.

Shaft links in various positions are shown in Fig. 1, and two links assembled with one cut through at its socket end to expose the engagement and the position of the pin, in Fig. 2. Each link has a square rounded knob at one end, and a square socket at the other, and at the base of the socket end a cylindrical exterior bearing surface. Two of the squared exterior walls of the socket are drilled through, and in the knob end is cut an

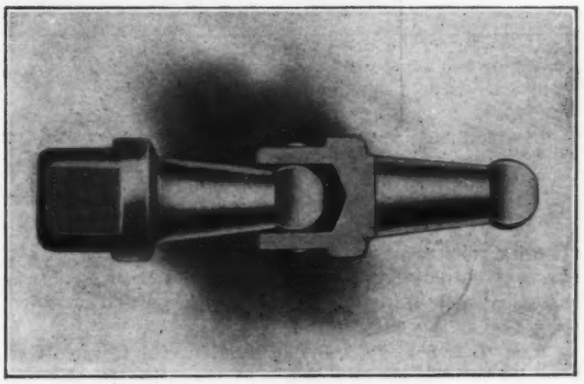


Fig. 2.—Two Links Assembled, with One Partly in Section.

elongated slot which permits a universal motion about the pin. The pins are riveted on the outer surface of the square part of the links. The pins are of soft steel and the links of hardened steel. The socket and knob in engagement give a positive drive.

While the maximum efficiency is realized at high speeds the shaft affords sufficient efficiency at low speeds for any work which is likely to be placed upon it. This has been a weakness of flexible shafting, that at low speeds a tearing strain has been experienced, and efficiency has been very small. The shaft runs inside of a steel spring which in turn is covered with leather.

The Le Blond Universal Cutter and Tool Grinder.

For about two years the R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, has been testing out in its own shops and correcting and improving a new universal cutter and tool grinder. As a manufacturer of milling machines it was in a position to appreciate what is necessary in a grinder for sharpening milling cutters, and it was principally because of this that it undertook the designing of the machine illustrated. Rapid and accurate work were the first essentials sought in its capabilities. While it is especially adapted to cutter grinding it is in every sense a universal machine, suitable for grinding all kinds of cylindrical, internal face and angular work, face mills, end mills, reamers, counterbores, circular saws, snap gauges, gear cutters, rose reamers, flat surfaces, and all other tool room work. The machine will grind any shape of cutter at any angle, or any taper or face, and embodies in its design many original ideas and modifications new to a tool of this type.

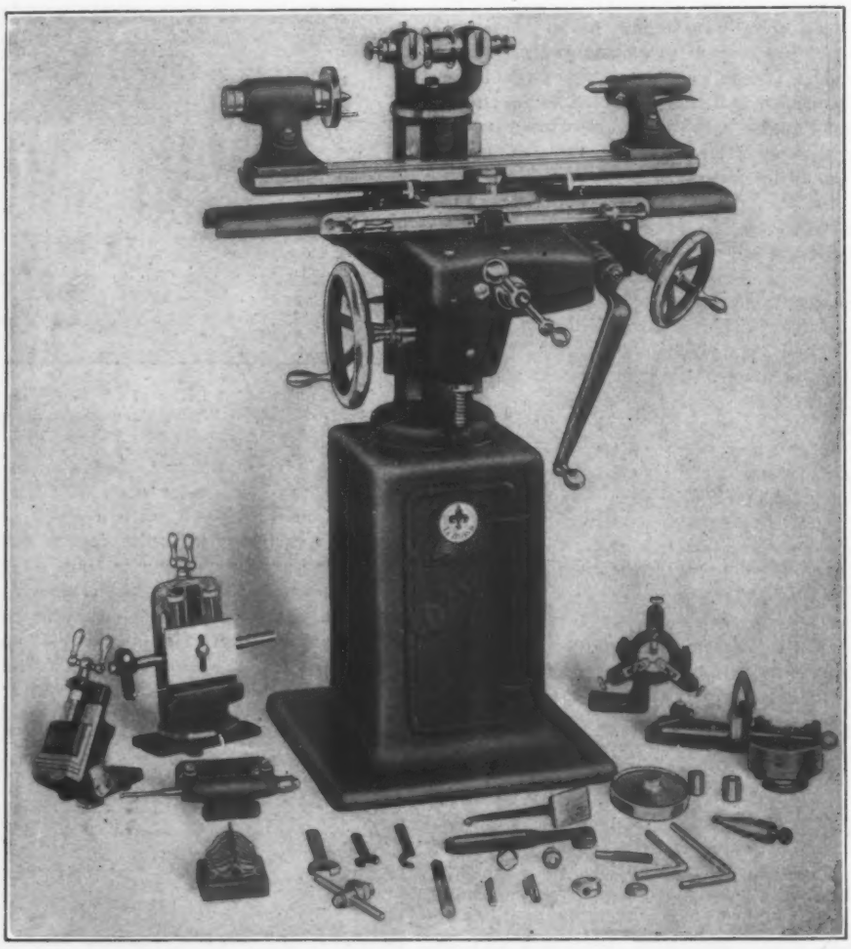


Fig. 1.—The New No. 1 Universal Cutter and Tool Grinder Built by the R. K. Le Blond Machine Tool Company, Cincinnati, Ohio.

Figs. 1, 2, 3 and 4 will be found useful to an understanding of the construction and operation of the machine; Figs. 5 and 6 show two of its attachments, and the remainder of the illustrations, Figs. 7 to 13, inclusive, show the grinder set up for various operations, indicating quite clearly its capacity and range of work.

As will be appreciated from Fig. 1, which shows the complete machine as viewed from the front, with all of its attachments on the floor around the base, and the side view, Fig. 3, the machine is not unlike a universal milling machine in the arrangement of its parts. The column, knee, saddle, swivel carriage, and table are all present, although in somewhat modified form, as the sectional views, Figs. 2 and 4, indicate, due to the different and more complex functions of a grinder. These are proportioned and disposed to give the greatest rigidity and adapt the machine for taking large inserted tooth cutters. A point worthy of note is that there are no stems, posts, slip bearings, and joints such as are frequently found in grinders. The convenience of the operator has been carefully considered as evidenced by the location of all the operating levers, which allow the operator to manipulate them all while keeping watch of the action of the wheel on the work. The cross feed screw and quick traverse shaft extend through the machine, and have a crank at both ends, so that they can be adjusted from either side according to where the operator happens to stand. All adjustments have a fine feed through hand wheels at the front of the machine, and fixed clamping handles are provided for locking all parts in any position.

Equally careful attention has been given to the lubricating and protecting of all cylindrical and flat bearings from grinding dust. Dust proof covers are provided for the oil holes, and the bearings are kept lubricated through belt pads. The spindle bearings have dust proof collars, and the saddle and table bearings have covers, so that they are never exposed. The knee bearing on the column has felt wipers.

A single pulley for a 2-in. belt drives the wheel spindle. The latter has taper boxes and may be driven at three different speeds from the countershaft, these being 3175, 4200, and 6365 rev. per min., so that the proper peripheral speed may be obtained for various sized grinding wheels. One end of the spindle is bored for a Le Blond SA collet, which enables the wheels to be removed and replaced without the necessity of truing up. The wheel spindle is eccentric to the column, and with the cross movement the minimum and maximum range of cutters that can be admitted is greatly increased.

The knee is of box section and swivels in a complete circle, on a supplementary sleeve on the column. It has a vertical adjustment of 8¼ in. below the center of the wheel spindle through the elevating screw operated by the hand wheel at the left in Fig. 1, and formed cutters,

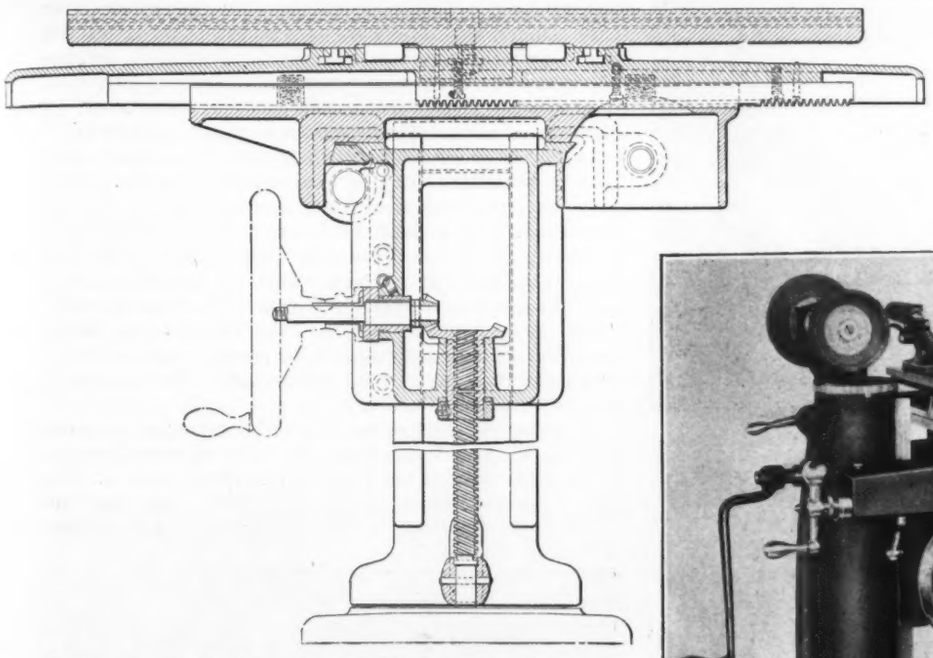


Fig. 2.—Longitudinal Section Through the Table, Saddle and Knee.

hobs, reamers, &c., can be ground on their radial surfaces without the use of drop centers. The saddle has an apron cast completely around it that forms a cover for the knee as well as the cross feed screw, and has a cross movement of 6¼ in. The table swivels through an arc of 90 degrees on either side of the center, and has a fine screw adjustment so that it may be accurately set to any taper. The base is graduated and is clamped securely in any position with two clamping bolts. The table has a longitudinal movement of 17 in., made with a quick traverse through the long lever handle which operates a pinion engaging a rack on the under side of the table, or with a fine feed for circular and internal grinding through the inclined hand wheel at the right in Fig. 1, which drives the rack pinion through spiral gears.

The head and footstock centers swing 8 in. and take 18 in. between them. The headstock spindle, which is tapered, revolves in a removable sleeve which can be clamped in the V block of the universal attachment shown in Fig. 6. The front end is threaded to receive a chuck. The footstock center is projected by a spring and can be quickly retracted by a thumb lever. This center

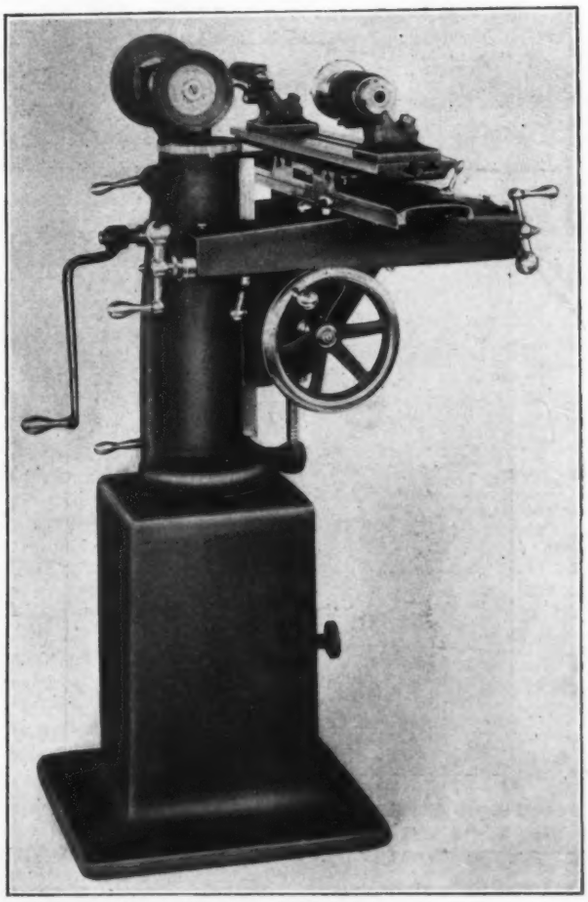


Fig. 3.—Side View of the Grinder.

can be removed and a special center for grinding reamers inserted in its place.

A complete set of stops and tooth rests are provided for all classes of work. With the machine is also furnished a countershaft, the journal boxes of which are provided with ring oiling bearings which need to be filled

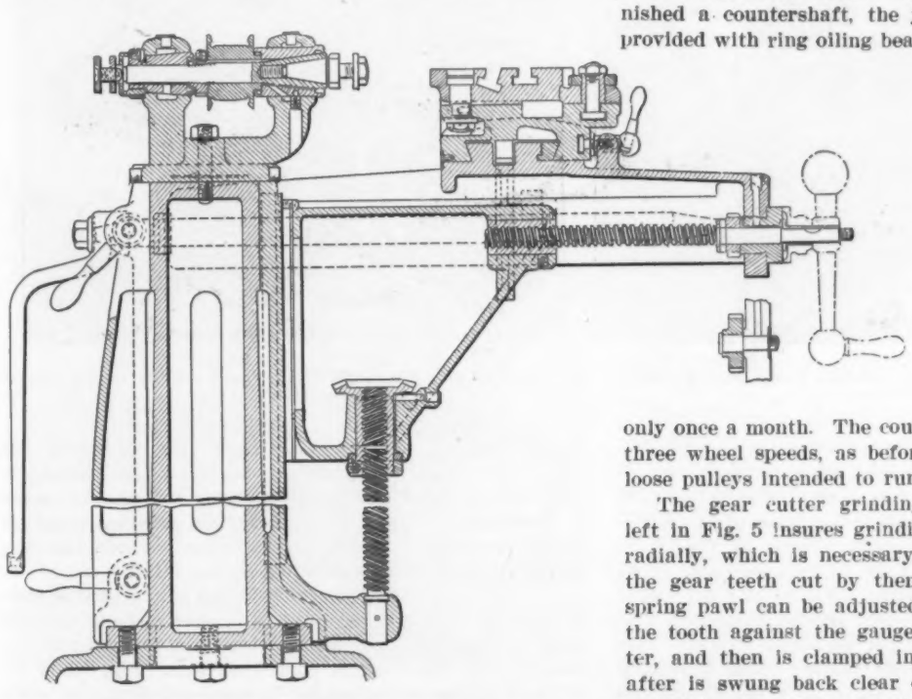


Fig. 4.—Transverse Section Through the Center of the Machine.

only once a month. The countershaft is arranged to give three wheel speeds, as before stated, and has tight and loose pulleys intended to run at 425 rev. per min.

The gear cutter grinding attachment shown at the left in Fig. 5 insures grinding the teeth of gear cutters radially, which is necessary, as otherwise the shape of the gear teeth cut by them would be incorrect. The spring pawl can be adjusted to bring the radial face of the tooth against the gauge which swings over the cutter, and then is clamped in position. The gauge thereafter is swung back clear of the cutter. The table is provided with stops regulating the depth of the cut. The

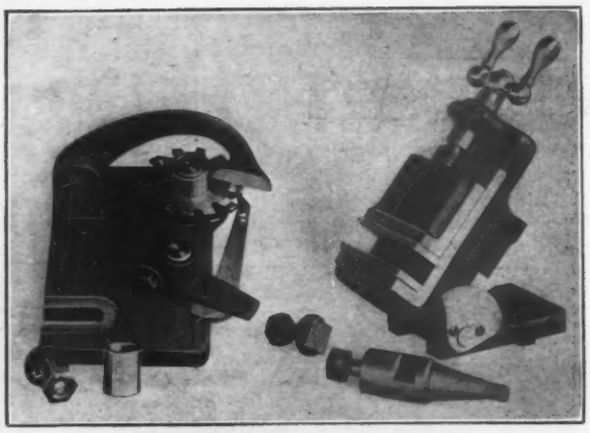


Fig. 5.—The Gear Cutter Grinding Attachment and Universal Vise.

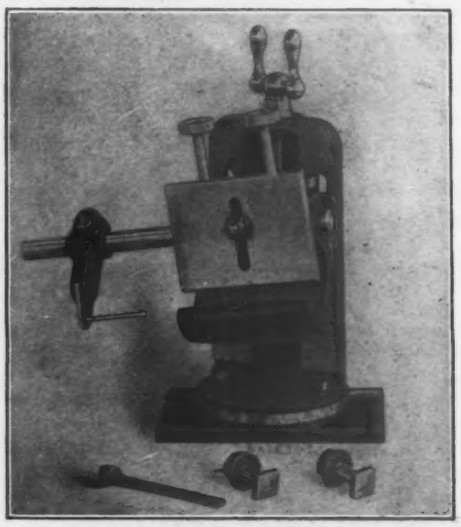


Fig. 6.—The Universal Work Holding Attachment.

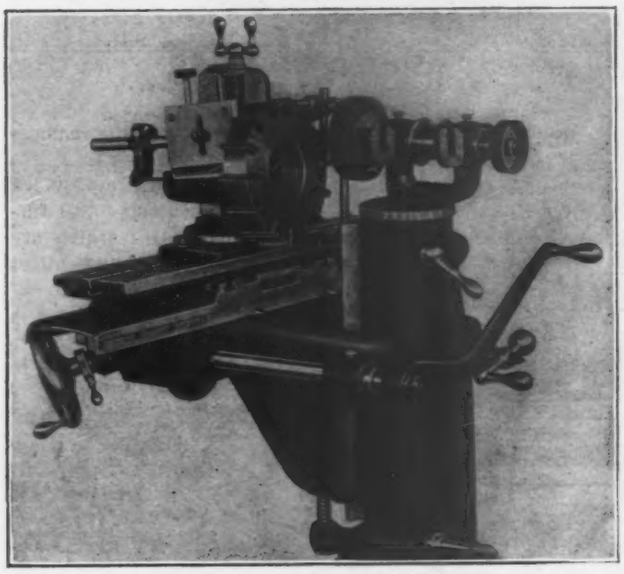


Fig. 7.—Grinding the Face of an Inserted Tooth Milling Cutter.

attachment will take in cutters up to 6 in. in diameter. Two bushings are furnished for cutters of ⅞ in., 1 1-16 and 1¼ in. holes. Fig. 5 also shows a universal vise which is convenient for holding many kinds of work.

The work holding attachment, shown in Fig. 6, is more completely universal in its adjustments and applications. The head swivels upon the base and the sleeve block can be swiveled completely around through a vertical plane. It will hold work mounted directly upon arbors or on straight or taper shanks. The headstock sleeve and spindle can be clamped in its V blocks and can be used for grinding work held in a chuck, such as cones, cups, collars, &c. The work is clamped by an adjustable jaw. Two thumbscrews at either end admit a delicate adjustment to the proper position. A floating center attached to an adjustable bar can be set for any length or diameter of work. The head has vertical adjustment.

A few of the many ways in which the universal work holding attachment can be used are indicated in the engravings showing the setting of the machine for difficult operations. Fig. 7 shows an inserted tooth milling cutter in position for grinding the sides of the teeth. The work is being held in the universal work holding attachment, and an adjustable tooth rest is supported from the table. When the operation is completed the work holding attachment can be swung through a horizontal angle of 90 degrees, and the ends of the teeth ground with the work in the position shown in Fig. 9.

Another example of milling cutter grinding is shown in Fig. 8. The work is in this case supported on an arbor held between the head and tailstock centers. The knee is partly swung around the column, and the table swiveled as indicated, so that the cutter can be ground

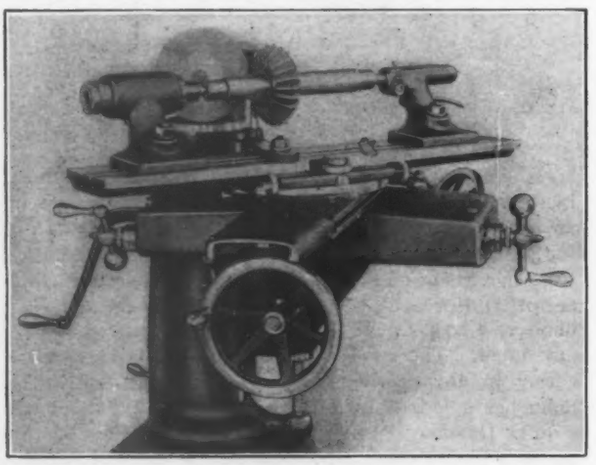


Fig. 8.—Grinding a 45-Degree Angle Cutter.

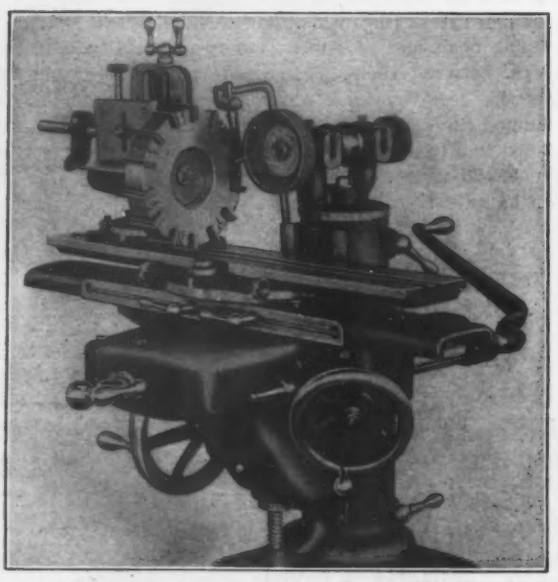


Fig. 9.—Grinding the Ends of the Teeth of the Cutter Shown in Fig. 7.

at the required 45-degree angle. For the setting of this angle the thumbscrew adjustment facilitates accuracy. The setting for the grinding of a formed milling cutter is presented in Fig. 10, where a thin grinding wheel is used, the work supported on an arbor between the centers and the tooth rest mounted on the table.

A case where the tail centers could not be used is seen in Fig. 11, where a 5½-in. stem reamer is being ground while being held in the universal attachment, without the necessity of removing it from the stem. Fig. 12 is an example of the setting up for internal grinding. In place

of one of the grinding wheels a belt pulley is substituted, and the auxiliary spindle secured to the face of the wheel spindle head, is belted from the latter and drives a small high speed internal grinding wheel. The work being done is the grinding of a taper hole in a spindle, which is held in a chuck in the head stock. To obtain the taper the table is swiveled the required amount, the adjustment being very accurately made by the thumbscrews.

A radically different piece of work is that shown in Fig. 13, where the teeth of a 16-in. disk saw are being cut. The saw is mounted on an arbor held in the universal work holding attachment, and the tooth rest, which was referred to before, will be seen to be secured in another position.

These illustrations, while typical of the operations possible on the new Le Blond grinder, are only suggestive of its versatility. A great many other settings can be made for standard or special jobs, and in the hands of an operator that is at all resourceful it would be hard to imagine a piece of grinding work too difficult to be accomplished.

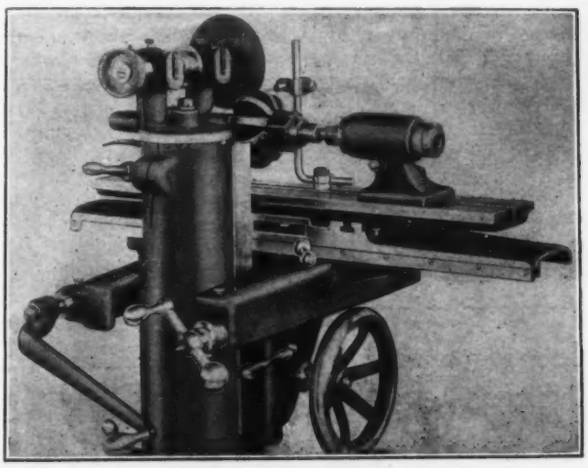


Fig. 10.—Grinding the Faces of a Formed Cutter.

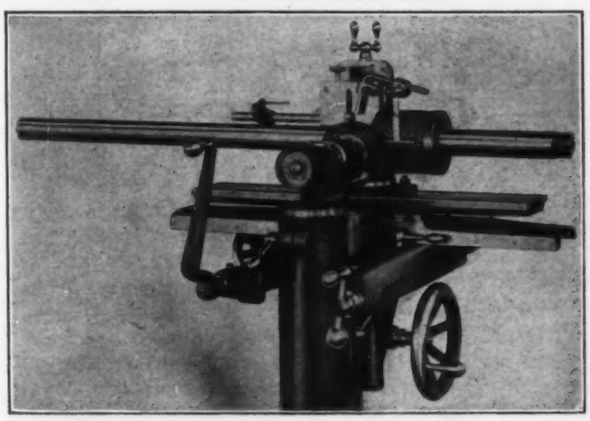


Fig. 11.—Sharpening a 5½-In. Stem Reamer.

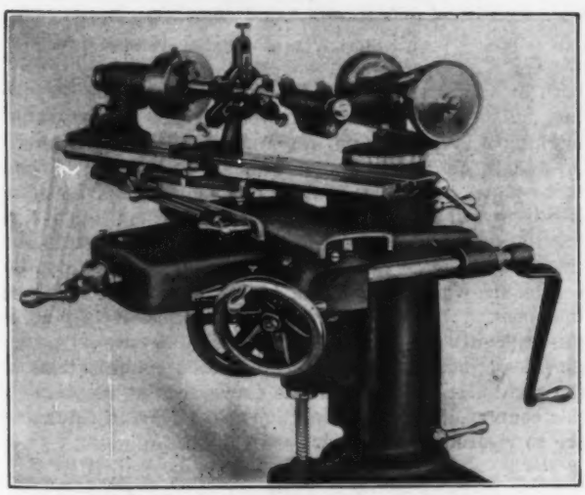


Fig. 12.—Grinding a Taper Hole in a Spindle.

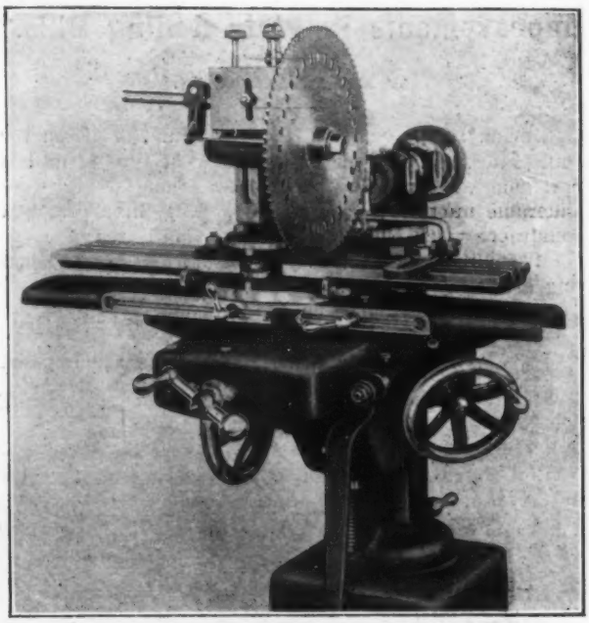


Fig. 13.—Sharpening a 16-In. Cut-off Saw.

Efforts to Modify the British Patent Act.

Advices from London, England, indicate that there is little chance of securing any material modification of the British Government's Patent Act of 1907, which becomes operative August 28 of this year. Judge C. H. Duell, formerly associate justice of the Court of Appeals of the District of Columbia, who went over to confer with British Government officials on the subject, particularly with the controller general of patents, is of the above opinion, and says that the immediate effect of the new law is to nullify the advantages accruing to many American manufacturers from the British free trade policy. The Patent Act specifies that all patents registered in Great Britain by foreigners shall become null and void at the expiration of four years after registration if the owner of the patent fails to build a factory in Great Britain and manufacture the article patented to "an adequate extent." The expectation of those who framed it was that American manufacturers would be forced to expend many thousands and probably millions of dollars in the construction of plants in Great Britain. Four or five retaliatory measures were introduced at the last session of Congress at Washington, but as there are about three times as many American patents registered in Great Britain as British patents in the United States it has been concluded that conference rather than retaliation is the best policy to pursue. Perhaps the strongest influence for a modification of the new British act is the movement to that end among British inventors and also inventors in the British Colonies who have patents in Great Britain. The latter threaten to work up retaliatory measures against the mother country. Among American manufactures which will be particularly affected by the new act are typewriters, cash registers, metal working machinery, laundry, boot, shoe, and leather working machinery, elevators and pneumatic tools.

The Golden-Anderson Valve Specialty Company, Fulton Building, Pittsburgh, has received an order from Armour & Co., Chicago, for 32 10-in. Anderson cushioned triple acting nonreturn valves for the protection of its power station. The Anderson automatic cushioned nonreturn valves are claimed to be the heaviest valves made, and, owing to their correct inside mechanical construction, they are guaranteed not to chatter, hammer or stick, and to be satisfactory, durable and entirely automatic. These valves can be tested at any time, and as often as desired without any interference whatever in the operation of the plant.

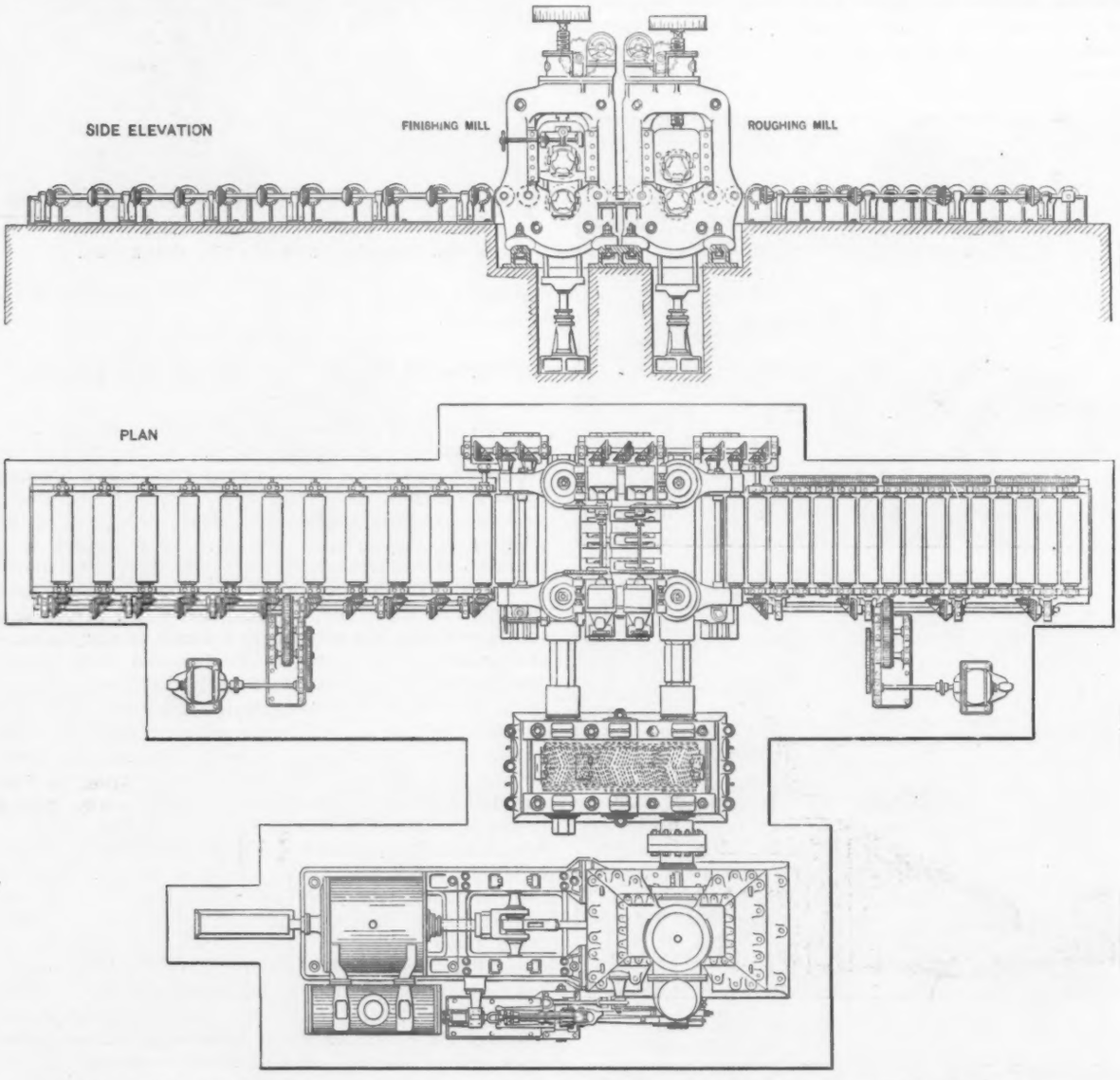
Improvements in Plate Rolling Mills.*

BY ANDREW LAMBERTON.

During recent years a large demand has arisen for thin plates, and the question as to what type of mill is best adapted for rolling such plates is one of very considerable interest to steel makers. The three principal conditions which plate makers must fulfill are:

1. Quality, represented by the usual tensile and bending tests.
2. First class surface finish throughout.
3. Close adherence to gauge thickness.

It is well known that these conditions are imposed much more rigorously in this country than in America or on the Continent of Europe. Here surface finish must be first class, and adherence to gauge thickness must be within 2½ per cent. over or under.



Figs. 1 and 2.—Side Elevation and Plan of Plate Mills at the Glasgow Iron & Steel Works, Wishaw, Scotland.

Objections to the Three-High Type of Mill.

In America steel plate makers are not under such stringent conditions, and the writer has seen thin plates being rolled in which a margin of 15 per cent. variation in thickness was accepted. Were it not for the stringency of the conditions to which he has referred, the probability is that plate rolling mills of the American three-high type would have been adopted in this country before this time. It is unquestionable that for thin plates the three-high mill has some advantages; but, unfortunately, it has the great drawback of being unable to maintain high surface finish on plates for more than two or three days, when the rolls require to be changed. This defect is inherent in the design of the mill where the roughing down of the slab and the finishing of the plate are done in one set of rolls, causing rapid deterioration of their surfaces. The usual practice is to use a top roll and a bottom roll of equal diameter with a mid roll of two-thirds their diameter. At every pass of the plate, whether between top and mid, or bottom and mid, the mid roll does work, so that twice the work is put upon it that the top and bottom rolls are required to do, and, as it has only two-thirds of their surface, it wears much more rapidly, the surface becomes quickly injured, and necessitates the changing of the rolls every two or three days, which is a drawback of a very serious nature.

The writer observed the outputs from three-high mills both in America and on the Continent, and while the surface finish of the plates delivered during the first 24 hr. working was good, there was a subsequent steady deterioration in quality of surface finish, until the rolls had to be taken out for re-dressing. To meet this, the practice is to roll all plates requiring the highest finish during the first 24 hr. working of the mill, and devote the subsequent one or two days' working to plates which do not require such fine surface or close adherence to gauge thickness. There can be little doubt that it is largely this difficulty of surface finish and adherence to gauge thickness, together with the undoubted complication of the three-high mill, which has prevented its adoption in this country, where the conditions of finish and thickness are so rigorously enforced.

Advantages of the Two-High Mill.

Our steel makers have, with practical unanimity, adopted the two-high reversing mill as the best to meet

* Read before the Iron and Steel Institute, London, May, 1908. Mr. Lamberton is head of the firm of Lamberton & Co., Coatbridge, Scotland.

the conditions obtaining here, and there can be no question that the surface finish got from two-high reversing mills is superior, and can be maintained with greater regularity and for a much longer time without changing rolls, than where three-high mills are used. The drafting of the rolls is also much simpler in two-high mills, and admits of more ready adjustment than when three rolls have to be regulated to work together with perfect exactitude. The live roller tables in two-high mills are likewise much more reliable in that they are fixed, and can be made as heavy and strong as desired, while in three-high mills these tables have to rise and fall at each pass, and therefore their mass and inertia have to be reduced to the lowest possible point commensurate with safety. This cutting down of weight tends to reduce the margin of safety, and frequent breakages occur, and it is well known that these tables are very costly in repairs, and in many cases complete spare tables are kept ready to put in when a breakdown occurs, so as to minimize the delay to the mill.

Another very important advantage possessed by the two-high reversing mill is that, when roughing down slabs, during which the passes are short, the mill can be driven at slow speed, so as to minimize the shock when the slab enters the rolls, while during the long passes the speed can be accelerated to any desired extent compatible with safety. The writer has taken notes of the speed at which reversing engines are regularly driven, and finds 140 rev. per min. quite common. This is quite twice the speed of three-high mills, so that the slowing down during the initial passes is amply compensated for before the finish. This method of working is obviously much easier on the mill plant than where the slab enters the rolls at full speed, as in the three-high system, causing violent shock and increased liability to breakage.

These are some of the practical considerations that have influenced steel plate makers in choosing the type of mill best suited at all points to meet the stringent conditions imposed, and, so far, the all but unanimous choice of the two-high reversing mill has been fully justified by results.

It is to be observed, however, that two new installations of three-high mills have been made during the last few months, one in Scotland and one in England, and the results from these will be watched with much interest.

The writer has thought it might prove of interest to members of the Institute if he gave a description of a new form of plate mill, having rolls 30 in. diameter by 6 ft. 6 in. long, which he has designed specially for rolling light plates, but which is equally suitable for ordinary ship and girder plates, now successfully at work at the Glasgow Iron & Steel Works, Wishaw. This mill possesses some quite novel features, for which the following claims may fairly be made:

1. Simplification in the operation of the mill.
2. Reduction in the amount of machinery required.
3. Reduction in the work done by finishing rolls, and consequent reduction in their wear.
4. Acceleration in delivery speed of finishing rolls, and equalization of power used in roughing and finishing rolls.
5. Final delivery of plates, straightened and free from wave.
6. Reduction in space occupied by the whole plant.
7. Large output capacity.
8. Economy in steam consumption of driving engine.

Simplification in the Operation of Mill, and Reduction in the Amount of Machinery Required.

This is accomplished by arranging the roughing and finishing rolls in tandem, instead of the usual practice of arranging them in the same extended line. [See illustration.] The slab is first reduced in the roughing rolls, and finally in the finishing rolls. During the process of roughing down, the top finishing roll is held up clear by its hydraulic balances, and the plate under treatment passes freely through the finishing rolls until reduced to the thickness ready for finishing, when the upper roughing roll is raised and the upper finishing roll lowered, and the subsequent finishing of the plate takes place through the finishing rolls.

It will be observed that, by this means, two sets of live roller tables—which in the ordinary type of reversing mills would be fitted at the front and back of the finishing rolls—are rendered unnecessary, one set of two tables serving both roughing and finishing mills. Further, by this new arrangement the transfer or skid gear, required in the former type of mill to transfer the roughed-down plate across to the finishing rolls, is also done away with, these constituting a very substantial reduction in the machinery employed, and decidedly simplifying the operations, as the slab to be rolled never leaves the straight line of travel during the whole process of rolling, and passes out, a finished plate, in the same line as the original slab is received at the commencement of the operation.

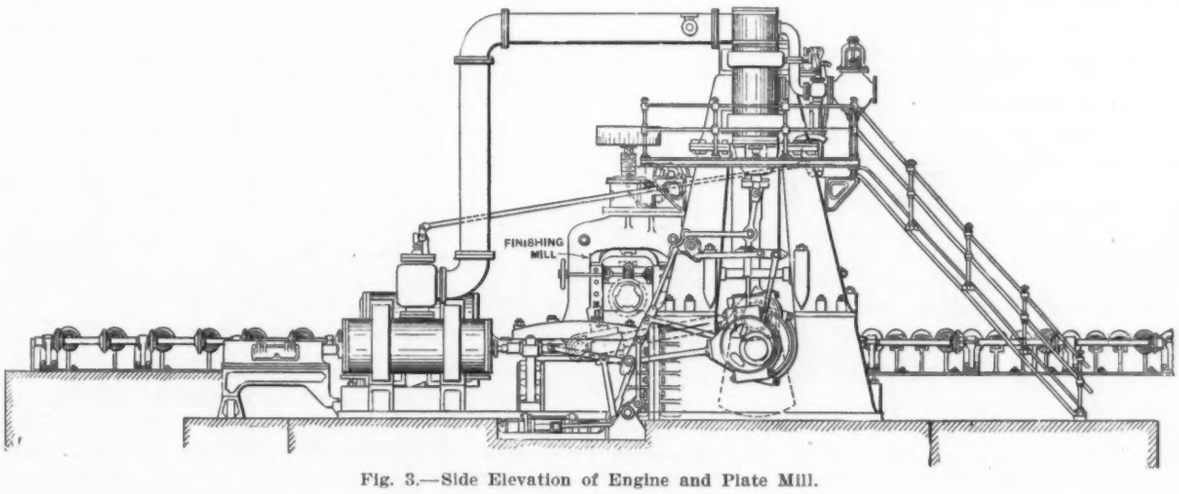


Fig. 3.—Side Elevation of Engine and Plate Mill.

Reduction in the Work Done by Finishing Rolls and Consequent Reduction in Wear.

In the ordinary type of mill, where the roughed-down slab has to be transferred sideways to the finishing rolls, the practice is to make this transference while the plate is still of considerable thickness, that it may not cool too rapidly during the process, so that, generally speaking, as many passes are made in the finishing rolls as in the roughing-down rolls. The writer considers this bad practice, inasmuch as it imposes a great deal more work and entails much more wear on the finishing rolls than is necessary. The operation of finishing should be done with the minimum number of passes, so as to reduce the wear on the costly finishing rolls to the lowest possible point, and maintain their surfaces perfect as long as possible.

This new form of mill is specially designed to effect this, as the roughing-down process can be carried on during 80 per cent. of the whole operations of rolling a plate, owing to the fact that it never requires to leave its direct line of travel, and the finishing process, representing some 20 per cent. only of the whole work, is all that

need be put on the finishing rolls. It is obvious that a very considerable saving must be effected in the finishing rolls, which have their work so substantially reduced, and their surface will be maintained in good condition for a much longer time. Further, the expense in changing and dressing rolls will be greatly reduced, and stoppage of the mill rendered less frequent.

Acceleration in Delivery Speed of Finishing Rolls and Equalization of Power Used in Roughing and Finishing Rolls.

From careful observations and diagrams taken from engines driving two-high plate rolling mills, it has been found that the process of roughing-down requires very considerably greater power than that for finally finishing the plate in the hard rolls. This means that the engine, which must be of sufficient power to give out the maximum demand made upon it, is over power when the finishing process is in operation, and the writer has utilized this excess power in accelerating the speed of the finishing rolls over that of the roughing. This results in the double advantage of equalizing the load upon the engine during the whole of the operations, and consequently increasing its efficiency, and also of providing a most useful increase in speed during the final passes when finishing the plate, which, when rolling thin plates, is of very great importance.

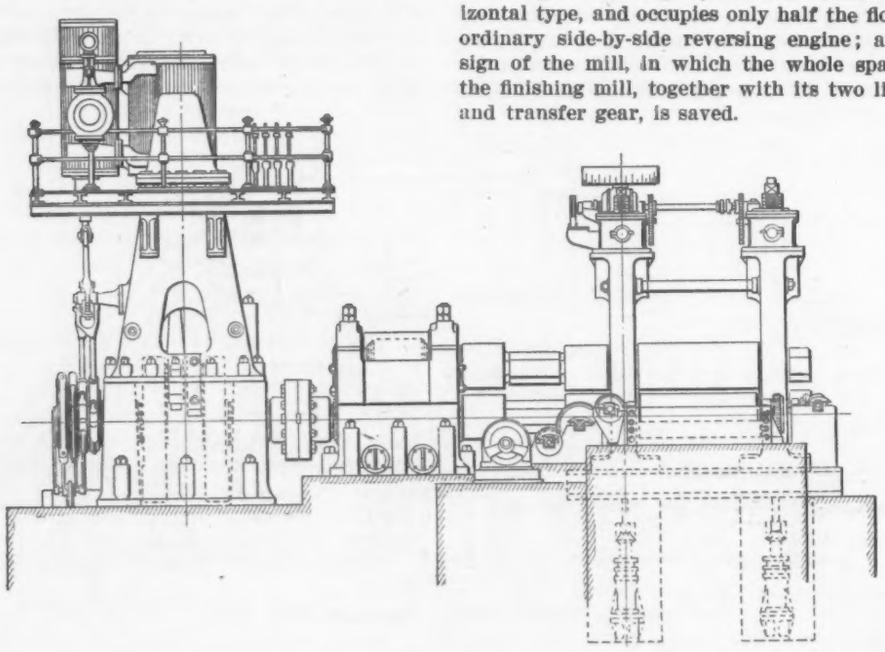


Fig. 4.—End Elevation of Plate Mill and Engine.

In the ordinary type of two-high reversing mill the power required for driving both roughing and finishing rolls is transmitted through the bottom roughing roll, and as it is the practice to partially rough down the slab while the preceding plate is being finished in the hard rolls, this doubles the strain on the neck and wobbler of the lower roughing roll and greatly increases the wear and tear on them. This system of working is followed in order to increase the output capacity of the mill, but it is obviously obtained at greatly increased cost, as the driving engine must be able to develop nearly twice the power required where work is only done in one set of rolls at a time, and is consequently much more costly.

At the best, it is only a few of the short initial passes that can be done simultaneously with the finishing of the preceding plate, so that for quite three-fourths of the whole operation only one piece is in the rolls, and the engine is then twice as powerful as is necessary, and must do the work with a substantially lower efficiency than when the load on the engine is kept constant during the whole operation. Further, this large surplus engine power is a source of danger when by accident a stall occurs in the mill, as the shock and strain induced in bringing the engine suddenly to rest are much intensified by its greater power and mass of moving parts.

Final Delivery of Plates, Straightened and Free from Wave.

In mills driven at high speed there is a tendency for the plate to become waved, particularly if it is of thin gauge, and the higher the speed the more pronounced is this tendency. To correct this, during the final pass in the finishing rolls the roughing rolls are also put down in light contact with the plate, and the mill then practically forms a four-roller mangle, which very effectually flattens out the plate before going to the shears.

Reduction in Space Occupied by the Whole Plant.

This consideration may not be of such importance where new works are being laid out; but in carrying out improvements in existing works the question of space occupied is almost always one of great importance. The total space occupied by a two-high reversing mill of the ordinary type, measured over its extreme length and including the driving engines, amounts to 70 ft. A mill of the same size and capacity of this new design, occupies 42 ft., representing a saving of 40 per cent. in the space occupied without in any way being more congested in its arrangements. This reduction in space is effected by (1) the design of the engine, which is of the vertical and horizontal type, and occupies only half the floor space of the ordinary side-by-side reversing engine; and (2) the design of the mill, in which the whole space occupied by the finishing mill, together with its two live roller tables and transfer gear, is saved.

Large Output Capacity.

This is obtained (1) by the simplification of the operation of the mill, in which the transference of the plate from roughng to finishing mills is abolished and the time taken for this operation saved; and (2) by the acceleration of the speed of the finishing rolls, which are driven 15 per cent. faster than the speed of the engine. The result is that a plate of, for example, 5 ft. x 30 ft. x ⅝ in. can be rolled in 2 min., and if this rate of feed could be kept up the output of such plates would be 400 tons per day of 10 hr. In rolling to thin gauge the slab is thinner, and the time taken for a plate of, for example, 5 ft. x 30 ft. x 3-16 in. is 2½ min., or at the rate of 130 tons per day of 10 hr.

Economy in Steam Consumption.

The steam efficiency of rolling mill engines has not in the past been conspicuous except for its absence; but much greater attention has been directed toward this subject lately, and substantial improvement has resulted. The engine driving the mill described is of the vertical and horizontal type, compound condensing, and has a high pressure cylinder 42 in. diameter and a low pressure cylinder 67 in. diameter by 4 ft. stroke. The steam pressure is 160 lb. per square inch, the exhaust is connected to a central condensing plant giving a vacuum of about 24 in., and the engine under these conditions develops the exact amount of power required. To insure quick reversing, the handling valves of both high pres-

sure and low pressure cylinders are connected and worked in unison from the same starting handle, as is now usual in modern compound engines. The closing of both these valves simultaneously acts as a most efficient brake, stopping the engine quickly, and preventing racing at the finish of the passes. The resulting increase in pressure in the receiver is then available for accelerating the speed of starting for the return pass, and so the efficiency of the whole operation is substantially improved.

Before closing, the writer desires to refer to a matter in regard to which there seems to be some difference of opinion in rolling mill practice. The question as to whether, in rolling plates, the rolls should be worked wet or dry is practically settled so far as regards the finishing rolls; but many makers still work roughing rolls dry. It seems only reasonable to believe that, if all rolls could be worked wet, it would greatly extend their life, and would prevent necks overheating and cutting into their bushes. The solution is to be found in the increased speed of driving, which enables plates to be rolled with such rapidity that the cooling effect produced by working the rolls wet is discounted by the heat generated by the work expended on the plate in reduced time. From careful experiments made on a large number of plates rolled from the same slabs it has been ascertained that the surface quality of plates rolled when both roughing and finishing rolls are worked wet is very distnctly superior to those produced when only the finishing rolls are worked wet. This clearly points to the advisability of all plate rolls being worked wet; and when consideration is given to the increased durability of the rolls, necks and brasses, and the reduction of frictional losses, the advantages gained by the great increase in the speed of rolling which has made all this possible are clearly demonstrated.

The performance of this new type of plate mill described in the paper has now been proved in actual daily work to be of the most satisfactory character, all the aims of the designer being more than realized.

DISCUSSION.

James Riley recalled that when he went to Scotland 30 years ago the output of the plate mill at the Hallside Works of the Steel Company of Scotland was 80 tons a week for one shift. He pressed for larger outputs, and was told by plate mill workmen that it could not be done, and that if what he proposed was carried out the rolls would become red hot and burst. At present the output is around 2000 tons a week. About 15 years ago the speaker put down the first three-high plate mill in Great Britain, which had about three times the capacity of the old two-high mill which stood alongside of it. It was a universal mill and for the tables American drawings were used. There were some troubles such as Mr. Lamberton pointed out. He did not agree with Mr. Lamberton in his comparison of the three-high mill and the old two-high mill, but believed it warranted if the comparison were between the three-high mill and the mill which had been described in the paper.

J. H. Harrison, referring to the statement of the paper that one pair of rolls was let down in order to form a four-roller mangle to flatten the plates before shearing, did not consider that straightening in that way would have a great effect. Either the rolls would be put down too hard and excessive work would be done because the plates stretched or the rolls would not be down sufficiently close to do any good. He thought it would be better to let the rolling mill be purely a rolling mill and do the straightening independently. While he thought it desirable that plates should not be finished in the way that American and Continental mills finished them, at the same time the mills in these countries produce a plate which is flat. It is not the province of the construction engineer to straighten plates; they should come from the rolling mill straight and flat.

J. M. Gledhill regarded the arrangement of tandem housings shown by Mr. Lamberton an excellent one, and if he were reconstructing his own mill he should adopt it, having roughing rolls and finishing rolls parallel. On the question of rapidity of rolling, the speaker said that when rolling plates beyond a certain thickness the surface of the slabs is worked at a higher rate than the interior and a varying action results, part of the plate being hollow and not homogeneous. He thought this was a point to watch in overrolling. The arrangement described permitted of running the mills at a slow rate, and then when the plates have got thinner, to go at a much higher speed. Probably that would have some effect in overcoming the difficulty, although he thought if once the hollow condition were produced and the plate even rolled thinner, the result might not be good.

P. N. Cunningham believed that the design of the mill shown by Mr. Lamberton would be the one adopted for plate mills in the future. When the speaker was in the United States four years ago he saw a plate mill the designer of which told him that he was the first to arrange the vertical rolls on the issuing side of the mill. It was a three-high mill and the vertical rolls were in contact with the plate. In that way the vertical rolls were assumed to be running at nearly the same peripheral speed with the horizontal rolls. In previous mills variations in these speeds had been the difficulty. The speaker agreed that Mr. Lamberton had overcome the difficulty of time lost by skidding across, but he found in his practice that the work done by the hard roll was 37 per cent., leaving 63 per cent. of the work done by the soft roll. He had made experiments in rolling with both sets of rolls wet, and found that with plates 5-16 in. thick and under, this method showed a saving in the pickling solution of 1½ per cent. as against having both sets of rolls dry. He was satisfied that under the former method there is less oxide than when plates are rolled perfectly dry.

H. Crowe, referring to the point made that the finish of the plate could not be made as good in the ordinary three-high mill as in the two-high mill, thought this could be taken care of easily by putting up two sets of three-high mills. The three-high mills in England generally have two sets of housings, the roughing down being done in soft rolls and the finishing in hard rolls. He thought there was no doubt that if the hard rolls and the soft rolls are driven by independent engines the output would be greater than is possible with Mr. Lamberton's mill. Referring to the saving of the time required for skidding the plate from the hard to the soft rolls as in two-high mills the speaker put over against this the time required, when changing from roughing to finishing rolls, for screwing down the lattetr. He considered that the output of a plate mill depends on the shape and size of the slab with which the plate mill starts. In the United States large outputs are secured by getting the steel from the slabbing mill in a shape that workers in Great Britain would call a piece of plate. He did not see how very much straightening is possible with the mill described, though if the soft rolls are run at a slower speed than the hard rolls a slight stretching action will result. In fact, in Germany an arrangement is in use by which plates are given a pull which straightens them effectually.

E. J. Duff believed that while Mr. Lamberton's mill might be made a success the same results might be accomplished with a three-high mill. The three-high mill to which Mr. Riley had referred turned out plates of perfect finish, and he had not seen its work equaled in this respect either in the United States or Great Britain. The defects in that mill were chiefly due to the fact that the tables were too weak, American designs having been followed. Had the directors of the plant eliminated these defects and gone ahead with the principle of three-high rolling he believed they would have accomplished everything claimed for the mill described.

Mr. Lamberton, replying to the discussion of the paper, said that he had succeeded in having a compound two-cylinder reversing engine work as rapidly in reversing as the double compound tandem type. There are only two cylinders, as against four, giving all the advantages in steam economy available in the double compound tandem, but with much less complication. What was said by Mr. Gledhill as to the defect produced in

the slab by too fast rolling no doubt applied particularly to armor plates. In referring to the power required, respectively, for soft and hard rolls, the speaker showed diagrams, according to which the indicated horse power was 3425 for the soft roll and only 2210 for the hard roll, showing a considerable margin of power at his disposal. He proposed later to equalize the power used in both sets of rolls as far as possible, believing that to be the proper way to work plate rolls. He emphasized the desirability of working plate mill rolls wet, as in that way the life of the roll would be much increased and the surfaces preserved a longer time. The necks would be prevented from heating and cutting, and there would be a saving in lubricants, in rolls and in everything. When to this is added improved quality of plates the working of rolls wet seems the only way. As to the suggestion that surface finish could be maintained by putting in two sets of three-high mills, that is not to the point, as the problem to be dealt with is the designing of one mill which will give the largest output for the smallest expenditure. But even with three-high mills, and double mills at that, far more changes of rolls would be necessary to keep up good surface than with the speaker's mill. As to the time saved in transferring or skidding being offset by that taken up in screwing down hard rolls and throwing off soft rolls he said that as a matter of fact in the working of his mill no time was lost. Beginning with a slab 4 in. thick from the roughing rolls, it is reduced to ½ in., and then the drawing of the screw gear follows down with the hard rolls keeping only a trifle behind. Replying to a question as to electric driving he said that while the design lends itself to electric driving the question of price comes in. If the suggested idea were carried out of putting a motor on the roughing rolls and one on the finishing rolls, there would be three motors with 3000 hp. to supply. Instead, he had one. Any advantage to be had from the use of two motors would be secured at a great increase of cost. Referring finally to output, he thought the crux of this question to be this: Can an ordinary plate mill be fed any faster than a slab every two minutes, the day through? Can it be said that there are facilities for this? Is there the heating power and the handling power? He had not seen the works in Great Britain at which such a rate of feed could be kept up. The mill having reached a speed greater than that of the feed, what is now wanted is to increase the facilities for serving it.

Tests of a Liquid Air Plant.—On this subject Bulletin No. 21 of the Engineering Experiment Station of the University of Illinois, by C. S. Hudson and C. M. Garland, has been issued. The plant on which the tests were made consists of a four-stage Norwalk air compressor and a Hampson liquefier of the laboratory type. The compressor was driven by a 15 hp. Westinghouse induction motor. The objects of the tests were to determine (1) the power required to liquefy the air; (2) the cost; and (3) the most favorable conditions for operating. The effect of the temperature and pressure upon the efficiency of the liquefier was determined; and, incidentally, some data were obtained upon the keeping properties of liquid air in Dewar bulbs of different sizes, and under different conditions. An interesting paragraph relates to the efficiency of liquid air as a medium in the production of power. The ratio of the available energy of the liquid air to the work required to produce it was calculated, and it was found that, under the most favorable conditions, not more than 2½ per cent. of the work required to produce the liquid air can be recovered by using the air to drive a motor. Copies of this bulletin may be obtained gratis upon application to the Director, Engineering Experiment Station, Urbana, Ill.

The rise in the price of cotton seed oil is directing the attention of the steel trade to fish oils for tempering steel. The N. B. Cook Oil Company, successor to Nehemiah B. Cook, 148 Front street, New York, is an old established house in this line, carrying heavy stocks of all kinds of fish oils, thus being well prepared to meet any demand for prompt shipment.

The Apprenticeship System of To-Day.*

W. R. WARNER.†

If we study men without an education, either trade or commercial, we realize that they are the men who are the laborers and we all know that the laborer is a good deal of a machine. In the words of a well-known manufacturer, "the man without an education is an automatic traveling crane." He has hands that can lift something, and by the aid of his feet and legs he can carry that something to another place. Without education that man will remain a traveling crane, but give him some education and if he has other qualities he becomes a more capable man, and can raise the price for which his service sells in the market. We pay the traveling crane $1.50 a day, and really it is a pretty high price. The uneducated man gets more than the educated man for what he does. The cheapest man the great manufacturing concern can hire is the $10,000 a year man; but the traveling crane gets $1.50 a day.

Some years ago the American Society of Mechanical Engineers met in Philadelphia and the Baldwin Locomotive Works invited us to inspect its plant. At that time it was making one locomotive a day. I did not care a snap for locomotives, after I had been there 5 min. I hung to the superintendent to ascertain wherein was his power over the men, for this power was apparent everywhere. Afterward I learned that he received a salary of $20,000 a year. A large salary, I thought, until I ascertained that that man had increased the output of that shop 50 locomotives a year, and it took but the sale of three to pay his salary. He was thus the cheapest man in the shop.

In considering the apprenticeship system I cannot help going back to the time when I left the district school in New Hampshire and started in to learn the machinist's trade. The differences between the opportunity given the boy then and now are as wide as you can imagine. We had to take our turn in wheeling the castings, in oiling the shafting, and in sweeping the floor, and then we were given excellent work in putting in boiler fronts. No apprentice would be given such work to-day, and yet it served to give me ideas I have always remembered.

The apprenticeship system is not obsolete; it still exists. I think there are more apprentices to the iron and mechanical trades to-day than ever before in this country. For 40 years the Brown & Sharpe Mfg. Company has had a system of apprenticeship and has turned out excellent workmen, foremen, superintendents and managers. The Pratt & Whitney Company of Hartford for over 45 years has taken apprentices and has turned out superintendents who are scattered all over our country. The New York Central Lines at this time have over 500 apprentices in their shops. Even the little concern with which I am associated has for over 25 years had many apprentices, and at the present time has some 35 or 40. It is plain, therefore, that the apprenticeship system is not obsolete.

A Business Proposition.

The aims of the manufacturer are purely commercial; this is to be admitted frankly. Our schools are founded on philanthropic principles to aid those who come to them, but the manufacturer takes an apprentice for only one purpose, to make money out of his services, certainly not to lose money. It is purely a business proposition.

The apprentice comes to the manufacturer for a purpose—for an education in mechanical lines. Can these two purposes be realized? Can I take an apprentice and so guide and manage his work that the result will be profitable to me and at the same time give him an education? I believe it can be done, indeed, it is being done by all the concerns I have mentioned, for the young men who are in the shops referred to do acquire a knowledge of the work. There are discouraging experiences at times; I could mention several, but you would not care to hear them. I will, on the other hand, refer to two or

* From a paper read at the first annual meeting of the National Society for the Promotion of Industrial Education, Chicago, Ill.

† Of Warner & Swasey Company, Cleveland, Ohio.

three encouraging ones. They are illustrative of the working of the apprentice system under favorable circumstances.

Apprentices Who Went to the Top.

A doctor in Cleveland came to our place and stated that he wanted to get a position for a young fellow who lived up in Maine and who wanted to learn the machinist's trade. I told the doctor that the boy ought not to come as far as Cleveland from Maine. I said: "Why doesn't he go to Portland or Boston? There are plenty of good jobs there. While we would like to have a good apprentice, it seems hardly worth while for him to come that distance." He replied: "Let me tell you about this boy. He lives 12 miles from a railroad. For years he fixed his mother's sewing machine, the clock in the house and everything of that sort, and finally he undertook to make a model of a locomotive. He had read about a locomotive and seen pictures of a locomotive, but there was one thing he couldn't understand, so he walked 12 miles to see one." When I heard all this, I said: "Send the boy along. That is the kind of a boy we want." So that boy came from Maine clear to Cleveland to learn the machinist trade. Before he had finished his apprenticeship he had won such a reputation that we took him in the drafting room and gave him six months there. In 1893 we sent this boy to the Chicago Exposition to study the exhibits there from all parts of the world. We wished him to bring home a lot of information, and he did. Very soon he was made superintendent and then manager of the works, and finally general manager. Now for several years his pay has been greater than the pay of any Government official in Washington, except the President.

Another of our apprentices came from a manual training school in Cleveland. He, too, got into the drafting room and became chief draftsman. One day he told us that he had decided to resign and start in business for himself. In a few years he was known all over the country, and now we buy his machines. He has made a splendid reputation, and is making a fortune because he knew how to think. That is the secret of success. Cases like these largely repay the care that a manufacturer must give to his employees, and they serve to counterbalance the other unsatisfactory experiences of which I spoke. In these instances, and in many others I might mention, the boys are taught much. One of the important things for them to learn is to look at the subjects from the right standpoint and to think all alone. That is one of the difficult things to teach them—to think alone.

Apprenticeship Debits and Credits.

One feature of the apprenticeship system we must not overlook is that it must pay for itself. The president of our college in Cleveland once remarked, when he had all the students together, "I see before me some charity students." The boys began to look all around to pick out the charity students; then he added, "you need not look; you are all charity students. For every dollar you pay the trustees have to provide $4 to put with it to furnish the facilities you have here." But the apprentices pay their own way, and I think they ought to feel that it is a square bargain. I am sure I felt when I left that old shop in New Hampshire that they did not owe me anything and I did not owe them anything. It was a square deal; I carried away all I could, and they had given me all they could. The students in our trade schools do not thus pay for their education, nor do the students in our colleges and universities. How much better, therefore, ought they to strive to make adequate return.

It is not possible to give full details in regard to the apprenticeship in individual factories. Each factory has its own system and code of rules, and changes them occasionally as necessity arises. We take the boys for a four-year term, and the first year we pay them 80 cents a day; the second year $1 a day; the third year $1.20 a day; the fourth year $1.50. At the completion of the four years we make the boy a present of $100 in gold. These are the terms on which our boys enter. We make no distinction and no difference whatever.

There is, however, one reward of merit that we hold out to them that has served to supply our drafting room with draftsmen for many years. This reward is for the boy who will qualify himself during the earlier years of apprenticeship by studying drawing. This boy we take into the drafting room for the last six months of his apprenticeship. It is a special reward, and I am sorry to say that not many go forward into the drafting room. The incentive, however, has served to develop those who have become our chief draftsmen, our foremen and our superintendents.

The progress of every boy in the apprenticeship system, as I presume it is in trade schools and in the colleges and universities, is wholly governed by the boy himself. One of the important things we try to impress upon the boy's mind is to think for himself and to think in practical lines. There are many illustrations of the success of the trade schools, of the technical institutes and the colleges. We all know them, but we know also that there are many failures. One of the things wherein we are weak is that we do not teach the boys, whether in the apprenticeship system, the trade schools, the technical institutes or the colleges, along lines sufficiently practical.

I once visited one of our leading technical institutes and was shown about by the professor of mechanical engineering with much pride and satisfaction on his part. We went through the laboratory and machine shop and brought up in the drafting room. A senior there had a series of drawings of a machine which stood beside him. He had made the plans and detailed drawings of every piece so that the patternmakers could make the necessary patterns. I asked the student how long he had been on this work and he told me the number of weeks. The drawings looked well, and the professor, I think, was not a little proud of that boy's work, yet all the threads on every piece were "left handed." "Not very important," you may say, but could that boy think alone? No. The mistake simply showed that the boy was not thinking of what he was doing.

Tests of Concrete and Reinforced Concrete Columns.—On this subject the University of Illinois Engineering Experiment Station has issued Bulletin No. 20, by Prof. Arthur N. Talbot. It records experiments upon concrete and reinforced concrete columns, which have already become quite notable and which will have a marked influence in fixing the standing of certain types of construction. A feature of reinforced concrete in which engineers and architects are much interested is the column having the concrete hooped or bound with steel bands or spirals. Tests on this form of column reported from France and Germany indicate great strength, but the results have not been considered conclusive. Professor Talbot's tests go to show that in hooped columns the steel hooping does not come into action to any great extent before a load equivalent to the ultimate strength of plain concrete, or a little below, is reached, and that up to this point the action of the coulmn is very like one of plain concrete. Beyond this load the column shortens rapidly and the deformation becomes very marked. The extreme amount of shortening is a great disadvantage. The amount of strength added by the hooping before ultimate failure is reached is two to three times as much as the effect of an equal amount of longitudinal reinforcement. Copies of this bulletin may be obtained gratis upon application to the Director, Engineering Experiment Station, Urbana, Ill.

The Ajax Mfg. Company, Cleveland, Ohio, builder of forging machinery, has entered into an arrangement with de Fries & Co., Düsseldorf, Germany, under the terms of which the latter will build the products of the Ajax Company and distribute them among the European trade. The London office of the company, at 9 Leonard street, will be discontinued. The Ajax Company will discontinue its export business to Europe, but will devote its attention in this line to the countries of North, Central and South America and the Orient.

The Brown Iron Ore Deposits of Alabama.—I.

BY WILLIAM B. PHILLIPS, BIRMINGHAM, ALA.

The area within which workable deposits of brown iron ore may be found in Alabama comprises about 7080 square miles. The geological formations involved are the following:

		Square miles.
Crystalline (below the Cambrian)		100
Cambrian	Weisner 125, Montevallo 400, Coosa 15	540
Lower Silurian	Knox Dolomite 1,450, Pelham 30	1,480
Upper Silurian. Red Mountain		15
Lower subcarboniferous, (Lauderdale, Keokuk), Fort Payne		1,100
Upper subcarboniferous, (Bangor, Hartselle,), Oxmoor		400
Carboniferous. Coal measures		2,285
Cretaceous		1,160
Tertiary		As yet unknown

Each of the above formations will be referred to briefly:

Crystalline.

The Talladega slates in Talladega County belong to this class, but they are not worked. In Calhoun County there is an area of about 20 square miles of these slates and they carry beds of brown ore, not, however, at present worked. The Clear Creek deposits, Chilton County, are in the crystalline and have yielded some excellent ore. With this exception little or no brown ore is now mined from these slates. The exact age of these slates is somewhat in dispute. Until the discovery of carboniferous fossils near Moseley, Clay County, a few years ago, they were considered as pre-Cambrian, but the age of at least a part of the so-called crystalline area must now be referred to the Carboniferous. In a general way the Talladega slates are to be found in that portion of the State lying east of the Central of Georgia Railroad and south of the Southern Railroad. This area has the general form of an equilateral triangle of 90 miles to the side, or about 3500 square miles. The area within which workable beds of brown ore may be found does not seem to exceed 100 square miles, but some of the best deposits in the State are within this limit. In the Talladega slates the brown ore occurs, both as residual deposits and as the gossan of underlying pyritic material. In the later case it is merely a question of time when the ore will carry too much sulphur to come into use for blast furnaces without previous roasting. There is, however, less phorphorus in these ores than is usually met with in brown ores from Alabama.

Cambrian.

Three divisions of the Cambrian carry brown ore in Alabama, viz., the Weisner (Chilhowee) sandstone, the Montevallo shales and the Coosa shales. (1.) The total thickness of the Weisner sandstone in Alabama is in excess of 2500 ft. In Calhoun County it has an area of about 59 square miles, and attains a thickness of 2500 ft. Brown ore is extensively mined near Anniston in this formation, although there is no well marked line of separation between the Weisner and the overlying Montevallo.

In Cherokee County, northwest of Calhoun County, this formation has a thickness of some 2500 ft. The famous Baker Hill deposits may be referred here to the Montevallo shales and the Knox dolomite. The excavations at Baker Hill are on a very large scale. The main pit is now down 300 ft. below the original top of the hill and is 2000 ft. long by 900 ft. wide. Mining has been prosecuted here since 1872, and there is no diminution of the supply. In Cherokee County the superficial area covered by the Weisner sandstone is about 30 square miles. In Cleburne County, east of Calhoun County, the area involved is about 45 square miles, but no deposits are now worked. The formation is also to be observed in Talladega County, but no deposits are now worked.

At present, therefore, the working deposits in the Weisner sandstone are confined to the deposits near Anniston, Calhoun County, and, in part, at Baker Hill, Cherokee County. In many parts of the brown ore regions there is no very distinct line of separation between the Weisner and the overlying Montevallo. In speaking of the deposits in the Weisner sandstone it must be understood that they are not restricted to this formation.

(2.) Montevallo Shales and Sandstones (Aldrich Limestone, Hayes' Lower Connesauga, Rome Formation, Beaver Limestone), constitute the second division of the Cambrian, which carries brown ore. The thickness in the State varies from 1200 to 3000 ft. In Calhoun County the thickness is from 1500 to 2500 ft., and the area involved is about 150 square miles. The deposits at Anniston belong here and in the underlying Weisner sandstone.

In Shelby County, south of Birmingham, the area is about 50 square miles, and the total thickness varies from 1500 to 3000 ft. The celebrated Shelby deposits, long used by the Shelby Iron Company in the production of its excellent charcoal iron, lie on the eastern edge of this formation and above strata, which are at the bottom of the Knox dolomite (Lower Silurian). In Talladega County the Montevallo covers an area of about 200 square miles and has a thickness of 3000 ft. The brown ore deposits it contains are not now worked.

(3.) The Coosa Shales, the third division of the Cambrian, have a thickness in the State of more than 1800 ft. The deposits of brown ore near Woodstock, Bibb County, and Goethite and Greeley, in Tuscaloosa County, can be referred here, as also to the Knox dolomite, and the Tuscaloosa formation of the Cretaceous. They overlie the Coosa shales and limestones. In this general locality the overlying Lafayette (tertiary) is practically barren of ore.

The group of brown ore deposits along the line of the Birmingham Mineral Railway between Wawah and Woodstock, as also those along the line of the Alabama Great Southern Railway in the vicinity of Greenpond, viz., Greeley, Goethite, Williamson, Edwards, Martaban, Greenpond, &c., cannot be referred positively to the Coosa shales, for they are in close association also with the Knox dolomite (Lower Silurian). The Tuscaloosa clays (tertiary), also come in, but they seem to be free of workable ore.

The maximum thickness of the Cambrian in this State, which contains brown ore deposits, is about 3000 ft. The area covered is about 540 square miles, of which the Weisner has 125, the Montevallo 400 and the Coosa 15. The most famous localities are at Anniston, Baker Hill, Shelby and around Woodstock.

Lower Silurian.

(1.) The Knox dolomite and chert (including Hayes' Upper Connesauga), belong under this head. In this State the total thickness of this formation varies from 2000 to 4000 ft., and the total area is about 1500 square miles. In Bibb County the thickness goes to 3000 ft., with about 40 square miles of area. The Bright Hope deposits, not now worked, are in this formation. As already observed, the deposits around Woodstock, Greenpond, &c., are referable partly to this formation and partly to the underlying Coosa shales. In Blount County the thickness is not exactly known, but the area is about 30 square miles, in the broken central part of Murphree's Valley. The Champion mines, which have yielded much fine ore and which have recently been reopened, belong here. They have been famous for fine specimens of needle ore.

In Calhoun County the thickness of the Knox dolomite is from 3000 to 4000 ft., and the area covered is about 200 square miles. Many brown ore "banks" have been opened in this county in this formation, as the Windom, Walker, Edmundson, Pine Grove Church, Leatherwood, Cooper, Alexander (Morris Mining Company), &c. Cherokee County contains this formation over about 150 square miles, with a thickness of 3000 to 4000 ft. The deposits known as Weems, Dyke, Taylor, Carr, Washer, McClung, &c., belong here. It is possible also that a portion of the Baker Hill deposits is to be referred to the Knox dolomite. Chilton County contains about 12 square miles of this formation, but it yields no ore. Cleburne County has only about 3 square miles, but some "banks" have been opened, viz., Tibbs, Brewster, &c. Dekalb County contains about 55 square miles

of the Knox dolomite, with a total thickness of 2500 ft. No deposits are now worked in this county.

Etowah County has 100 square miles, with a thickness of 2000 to 2500 ft. There is one good deposit in this county which has been opened—the Robert Jelkes (northwest base of Colvin Mountain). Jackson County contains 80 square miles, with a thickness of 2000 ft., but no deposits are worked. Jefferson County has 50 square miles, with a thickness of 2000 to 3000 ft. No deposits are worked in this county, although the deposits at Greeley and Goethite would seem to come into the extreme southern part and to afford good ground. Marshall County has two small areas of Knox dolomite, but no mines. St. Clair County has 140 square miles, with a thickness of 2000 to 3000 ft. The deposits near Seddon, on the Southern Railway, are to be referred here. Shelby County has 200 square miles, with a thickness of 3500 to 5000 ft. The famous deposits at Shelby lie on the eastern edge of the Montevallo shales and above the Knox dolomite.

Talladega County has a large development of the Knox dolomite, 400 square miles, with a thickness of 3000 to 4000 ft. The deposits known as the Ledbetter, Singleton, Fournoy, Welch, Reynolds and Whiting, Carlton, Webb, Weisinger, Jones, Seay, Irona, Hurst, Pace, Lennard, Logan, Washer, Dye, Curry and Fox, Parker, Poorhouse, &c., belong here. The ores from the Knox dolomite in Talladega County have been used in the furnaces at Ironaton and Jenifer. It is probable that Talladega County will be the great brown ore county of the State. The Knox dolomite is especially favorable for the occurrence of extensive beds of brown ore, and it is developed on a very large scale in this county. The deposits that have been opened and worked have shown a good grade of ore, easily washed. The ore from some of the "banks" carries more phosphorus than is generally the case with our brown ores, but this seems to be a local circumstance. On the other hand, it may be stated that there were shipped from a Talladega County furnace some years ago 3000 tons of pig iron which was within the Bessemer limit for phosphorus. Tuscaloosa County has about 15 square miles of the Knox dolomite, with a thickness of 2000 to 2500 ft. The deposits around Greeley and Goethite belong partly here and partly in the Coosa shales (Cambrian), as already observed.

The maximum thickness of the Knox dolomite in the State is about 5000 ft., and the total area covered is about 1450 square miles, of which Bibb County has 40, Blount County 30, Calhoun County 200, Cherokee County 150. Chilton County 12, Cleburne County 3, Dekalb County 55, Etowah County 100, Jackson County 80, Jefferson County 50, St. Clair County 140, Shelby County 200, Talladega County 400, and Tuscaloosa County 15. The Knox dolomite is to be regarded as the most important source of brown ore. It is not known how much of the 1450 square miles under consideration contains workable beds, but many of the best ore "banks" have been opened in this formation.

Map of the Northern Two-thirds of Alabama, Showing the Principal Brown Ore Areas in the State.

(2.) The Pelham limestones (including also the Trenton, Chickamauga and Rockmart slates) have a thickness in the State of 600 to 1800 ft. They yield but little brown ore. Jackson County has about 30 square miles, with a thickness of 700 to 900 ft., but no ore is mined there.

The Lower Silurian, which furnishes brown ore, has a maximum thickness in the State of about 4000 ft., and covers a total area of 1480 square miles, of which 1450 belong to the Knox dolomite and 30 to the Pelham limestones, which lie between the Knox dolomite (Lower Silurian) and the Red Mountain (Clinton) of the Upper Silurian.

Upper Silurian.

The Red Mountain (Clinton, Rockwood) formation belongs here. In Jackson County there is an area of about 15 square miles, with a thickness of 200 to 225 ft.

It contains some deposits of brown ore that have not been opened. There are other isolated patches of brown ore in the Red Mountain formation, but they have not yet attained commercial importance.

Lower Subcarboniferous.

The Fort Payne (Lauderdale, Keokuk) chert is thus identified: The maximum thickness of this formation in the State is about 600 ft. and it covers about 1100 square miles. Bibb County has 8 to 10 square miles, with a thickness of 50 to 175 ft.; Blount County, 20 square miles, with a thickness of 175 to 225 ft.; Calhoun County, 30 square miles, with a thickness of 25 to 150 ft.; Dekalb County, 35 square miles, with a thickness of 200 to 300 ft.; Etowah county, 15 square miles, with a thickness of 150 to 275 ft. In the last named county, in Sand Valley, on the uorthwest slope of Red Mountain, the brown ore is associated with manganese ore.

Jackson County has 50 square miles, with a thickness of 100 to 150 ft., and Jefferson County 30 square miles, with a thickness of 250 to 300 ft. In Lauderdale County this formation reaches its greatest development, with a thickness of 175 to 250 ft., and an area of 450 square miles. In Limestone County, also, the development is extensive, with an area of 400 square miles and a thickness of 175 to 225 ft. The O'Neal deposit belongs here. Marshall County has an area of 15 square miles, with a thickness of 150 to 185 ft. St. Clear County has an area of 35 square miles, with a thickness of 150 to 275 ft. Shelby County has an area of 15 to 20 square miles, and the thickness varies from nothing to 150 ft. The following deposits appear to be in this formation: Bluff Creek, Lauderdale County; Cane Creek, Calhoun County; Janey Furnace, Calhoun County; Monahan, Calhoun County; O'Neal, Lauderdale County. Only a few of the deposits in the Fort Payne chert have reached commercial development.

Upper Subcarboniferous.

Under this head are Oxmoor, or Shale and Sandstone Phase; Bangor or Limestone Phase, and Hartselle Sandstones. The thickness is about 2600 ft., and the area involved about 400 square miles. Bibb County has an area of 10 square miles, with a thickness of 600 to 1000 ft. Chilton County has an area of 17 square miles. Franklin County has an undefined area around Franklin Springs. St. Clair County has an area of 120 square miles, with a thickness of 600 to 1500 ft. Shelby County has an area of 250 square miles, with a thickness of 1200 to 1800 ft. The Upper Carboniferous is not yet commercially important as a source of brown ore.

Carboniferous.

The thickness in the State of the carboniferous formation or coal measures is 5500 to 6000 ft., and the area involved 2285 square miles. Cherokee County has an area of 150 square miles, with a thickness of 400 ft. Dekalb County has an area of 600 square miles, with a thickness of 600 ft. Franklin County has an area of 150 square miles, with a thickness of 250 ft. The Rockwood deposits belong here. Jefferson County has an area of 700 square miles, with a thickness of 2000 to 2500 ft. Marshall County has an area of 325 square miles, with a thickness of 325 ft. The Ridgeway deposit belongs here. Tuscaloosa County has an area of 360 square miles, with a thickness of 4000 to 5000 ft. There are no deposits in this formation which are now at work.

Cretaceous.

The thickness of this formation is not yet known. The area involved is about 1160 square miles. Bibb County has an area of 415 square miles, with a thickness not yet known. The deposits around Woodstock lie partly in this formation, partly in the Knox dolomite and partly in the Montevallo. They belong to the Cretaceous, the Lower Silurian and the Cambrian. Tuscaloosa County has an area of about 745 square miles, thickness not yet known.

Tertiary or Lafayette.

The thickness is not yet known, nor is the area. Bibb County has an area of unknown extent. The deposits in this county may belong to the Lafayette, or to some earlier formation. The deposit a mile west of Centerville is a case in point. Colbert County has an area of 290 square miles, thickness unknown. The deposits known as the Wingo and the Linewood belong here. Franklin County has 460 square miles, thickness unknown. The deposits at Russellville and Parish probably belong here. Lauderdale County has an area of 125 square miles, with a thickness of 80 ft.

In Lauderdale County there is some brown ore in the Lafayette. In Shelby County, on Camp Branch, and in the southern part of Township 22, Range 1, East, two miles west of the Coosa River, there is an area which carries brown ore, and it may belong to the Lafayette. Tuscaloosa County has a little good ore in the Lafayette, but the commercial outlook is not very promising. Having thus considered the area within which commercial deposits of brown ore are found, we will consider, in subsequent articles, some of the more important deposits in detail.

A Map of the Principal Brown Ore Deposits.

The map accompanying this article has been prepared from a map kindly loaned by Dr. Eugene A. Smith, State Geologist of Alabama. Upon it the chief brown ore areas are delineated by cross hatching. It has not been thought necessary to show every deposit in the State, but only the principal ones, such, for instance, as the deposits in the counties of Cherokee, Calhoun, Talladega, Shelby, Tuscaloosa, Franklin, Chilton, &c., with the area in the eastern part of Jefferson County and the southwestern part of St. Clair. It is not meant that there are no other areas worthy of consideration. The mines now in operation are within the counties named.

While the area covered by the formations within which workable deposits of brown ore may be found is in excess of 7000 square miles, as already stated, this does not mean that there are 7000 square miles of brown ore lands in Alabama. It is not now known what is the workable area of brown ores in this State, and a great many years will pass before reliable data of this kind can be expected, if ever. From the very nature of brown ore deposits in this part of the country it is practically impossible to give the area within which this variety of ore may be profitably worked, or the reserves of ore in areas that have already been opened and from which ore has been and is being mined. Statements of the area within which workable deposits may be found must be taken with the understanding that each sub-area and almost each deposit is to be judged for itself. While there are certain general principles governing the matter they must not be accepted too literally. It is a very common remark that brown ore deposits are treacherous; they are workable to-day and not workable to-morrow. To-day the clay may yield pay ore, to-morrow there will be a "white horse" or a bed of stiff bluish clay that contains no ore at all. All of this, of course, is not to be denied, and yet there is a deposit of brown ore in Alabama that has been worked continuously since 1850, another since 1872, another since 1880. These deposits are being worked to-day and promise to afford good ore for years to come.

During the last 10 years there has been mined in Alabama nearly 7,500,000 tons of brown ore, and the present demand is active and at times insistent. There is every reason to believe that in the next 10 years the demand for good brown ore will be much larger than it has been in the last 10 years. As more and more of the limy ore is mined, more brown ore will be wanted. Some furnaces run entirely on brown ore, and there is scarcely a furnace in the State that would not gladly increase its use of brown ore if the supply of good material were to hand. The recent bringing in of 3000 to 4000 tons of Texas brown ore into Alabama was rendered possible by two considerations: It is very high grade for brown ore, the metallic iron running from 56 to 58 per cent., and it is remarkably low in phosphorus, 0.10 to 0.15 per cent. The average brown ore in Alabama does not contain more than 45 per cent. of metallic iron, nor below 0.30 per cent. of phosphorus.

The American Can Company, New York, has purchased the plant of the Acme Can Works, Montreal, Canada.

The Chilled Cast Iron Car Wheel.

Problems Growing Out of the Present Practice of Makers and the Railroads.

BY P. H. GRIFFIN.

The conditions that prevail in the manufacture and use of car wheels are so serious that the need of some prompt action to better them has become very urgent. The life of wheels has been reduced to less than half of what it was a few years ago, causing a heavy increase in cost of that service; certain causes of removal have become intensified and are increasing at a rate that indicates grave danger unless some remedy for them is found, and accidents caused by failures of certain kinds are becoming more frequent. In recent years steps have been taken by the Master Car Builders' Association and by representatives of the chilled car wheel makers to investigate the whole matter, and important action in the way of standardizing the section of chilled wheels has been secured. In fact, the whole subject has received more active attention in the past few years on the part of the makers and users of wheels than ever. A number of obstacles to be overcome in dealing with matters of this kind cause delay. These include the time necessarily required to make investigations and to secure the approval of railroads and manufacturers to one course of action; the cost of making the proposed changes; the time actually required to carry them out when decided upon; and above all is the disposition of wheel makers and of railroad officials immediately in charge of such questions to avoid any action that would indicate conditions involving responsibility that might be definitely located by public discussion.

Early Action Demanded.

If present conditions were such that considerable time could safely be taken to deal with them, it might be well enough to treat the matter that way. But unfortunately the causes that have created the present conditions do not properly admit of much time in dealing with them, and the danger to life and property is becoming so grave on account of the rapid development of these causes that it is high time the matter were plainly dealt with.

Naturally the winter season is the one in which the results are the most serious, on account of the decreased resistance of steel and iron to strain and shock under low temperatures, and at such seasons the difficulty of handling cars and the congestion at terminal points throw added burdens on all concerned. Thus arises such a question of physical endurance in dealing with this matter that it must be attended to during the milder season.

To review the subject and present some essential facts may enable railroad officials and wheel makers to get it in mind better. In this connection it is vitally important to give the whole matter reasonable and general consideration and to have united action from the standpoint of the grave responsibilities involved. It is not a question that can be individually dealt with.

Individual Action Does Not Meet the Case.

The handling of interchange traffic constitutes the principal part of the business of all railroads, and the danger involved in the failure of any one wheel reflects in a general way on all wheels of the same class. It will not do for any single railroad to think its responsibility is fulfilled by establishing certain orders of test inspections and purchase of wheels, or for any single wheel maker to content himself with his own practice and methods. The railroads are responsible as a whole for the rapid change that has been made in the loads carried and speeds attained, and the wheel manufacturers as a whole are responsible for such action as will preserve to the greatest extent possible the factor of safety in the product supplied. Unfortunately many causes have operated in recent years to reduce this factor until it is now at the lowest point ever known.

There certainly must be some limit at which the increase of speed and load must stop, and some limit at which the effort to reduce wheel costs ceases to be either practicable or possible. So far as the manufacturers of chilled wheels are concerned, the question of the cost and returns of wheel service has reached such limits in recent years that there can be no further progress in that direction. Of all items of railroad equipment none can compare with the chilled car wheel in low prices and reduced cost.

Many Unfit Wheels in Service.

To what cause this is due and to what extent it is really economical is not so important as the cold fact that hundreds of thousands of wheels are in service that should never have been put in, and many more that should be removed as quickly as possible because of defective condition. Railroad officials having a knowledge of these facts do not like wheelmakers to admit them, and unforunately such knowledge is possessed more in a general than a particular way. Assertions that present conditions are not very bad, and that the necessary, in fact all possible, steps are being taken to remedy the trouble are frequently made; but the continual and rapid increase of certain fatal defects found in nearly all wheels removed from under heavy equipment (and in the standard design of wheel generally adopted) does not bear out such assertions. The general practice in this country in matters of this kind is to make changes that promise the results sought for, then to institute them as current practice and later to develop the necessary means of meeting the situation.

The introduction of heavy capacity freight cars is an illustration. Their use involves a load of about 8 tons, frequently rising to 10 tons, per wheel. Under this burden the wheel must do its work in all seasons, often on heavy grades with brake application long continued, causing rapid heating of tread and flange. Rapid cooling in snow or water often follows, creating conditions that in any mechanical operation would never be expected to contribute to safety.

Price Factor.

So far as the chilled wheel is concerned the maximum available to produce an article for this arduous labor will not exceed $3.50, plus the delivery of an equal weight of wornout or scrap car wheels. Out of this small sum the maker must provide for all labor required; for coke, sand and all the sundry merchandise required for the manufacturing operation; for all cost of supervision, freight and general business expenses; for all claims on guarantee account; for cost of inspection and tests, and for the difference in value of all new iron used and of the scrap wheels received in part payment.

There are many ways of buying and selling wheels that appear to produce a different result in this matter of net payment, but the prices paid for years past and at present will not average that named. A standard 33-in. wheel for 50-ton car service weighs 700 lb., and on the basis named the maker receives $3.50. For this net price the railroads receive wheels guaranteed to give service of four years or more against all causes for which the maker can be held responsible. This means a theoretical cost of less than $1 per wheel per annum. It would seem as if the greatest theoretical economy in this direction has been attained.

Of course, all wheels do not remain in service for four years, an increasing proportion being removed in less time. Then a struggle between the railroad and the wheelmaker often takes place to see whether a claim for replacement under guarantee can be made or resisted.

To such length has this order of practice grown up that it is safe to say that the cost of inspecting and testing, of keeping guarantee records and of putting in and removing wheels from service, and of wrecks and accidents caused by wheel failures, far exceeds the net cost of new wheels purchased. It is not so material whether this condition is the fault of the wheelmaker, who, as some railroad officials say, should insist on a price sufficient to enable the production of good wheels and refuse to accept orders on any other basis, or of too rapid change in the wheel burden by rapid increase in carrying capacity of car.

The Steel Wheel.

The all important question is, what can be done to remedy present conditions It is said by some that steel

wheels must be used if chilled wheels cannot do what is demanded of them. With no desire to discuss a question that can only be settled by service results, it is interesting to consider the possibility of getting railroads to pay the price at which the cheapest steel wheel can be bought and its relative value as scrap when worn out compared with their unwillingness to add 25 or 50 cents per annum, on the basis set forth above, to the price paid for chilled wheels in order to secure a better article. Just what arguments and inducements will accomplish this result are not easy to see, but it is important for all concerned to weigh the matter fairly and squarely.

Divided Responsibility of Railroad Officials.

That the average wheelmaker wants to make and the average railroad official wants to buy good wheels, may be admitted. But it is necessary to say that these desires are not realized, the reason appearing to be one of a certain order of practice that has gradually grown up. The mechanical officer draws up specifications and tests; the purchasing agent gets competitive prices and guarantees; the order is placed, the wheels are made, presented for inspection and delivered if accepted. In drawing up specifications and tests or changing them from time to time, the mechanical officer inclines to the idea of making them more severe; it indicates more stringent practice. Each increase in test requirements naturally involves increased cost to the maker. But that is a question to be settled between the purchasing agent and the wheelmaker and one on which the mechanical officer is generally if not always silent. His duty is to make the tests exacting enough and to see that his inspectors enforce them.

The purchasing agent's duty is to buy the wheels subject to the tests and inspection, at the best competitive price and terms obtainable. Railroads generally place orders with manufacturers located on or near their lines. They generally establish current prices for new and scrap wheels annually or when prices change; but purchasing agents have been bargaining over car wheels so many years to gain a few cents (theoretically) from year to year on prices paid, that the average prices have gone down so far that the quality of iron that should be used to make a good wheel can hardly be bought for the price paid. It follows that cheaper iron and the least expensive methods of manufacture must be used to meet the price paid and avoid loss. This has gone on so long, and so many wheels have been made and put in use under these conditions that the reckoning has now come.

Railroads Getting What They Pay For.

Just why railroads should expect wheel makers to do business at a loss or whether they expect them to make and deliver good wheels regardless of the price paid, it is not easy to say. It is not probable that the railroads would accept the responsibility of conditions that prohibit the delivery of good and safe wheels. But are they relieved from responsibility for the purchase and use of car wheels, by reason of the fact that specifications, tests and guarantees call for the delivery of good wheels, when the fact is that the price paid is too low? An answer frequently made is that the wheel makers are eager for orders at present prices. Of course they are. To stand any chance of coming out even, the daily output must be kept up. Making a few wheels at $3.50 each is not an operation that can be profitably conducted; therefore, orders for more must be secured. But the total result is that the railroads will get what they pay for, and ultimately pay for what they get—somehow.

The Tread and Flange Changes.

To show the limit to which these matters have gone, the increase in thickness of wheel tread and flange officially adopted by the M. C. B. Association may be cited. Naturally, the increase would add to the weight of the wheel, necessitating a slight increase in cost for the extra metal. How many railroad companies have been willing to pay this slight extra cost? Wheelmakers, after much attention given this question, find themselves in the position of having to furnish the heavier wheel at the same price received for the wheel with lighter tread and flange.

It is argued on the part of railroad officials that the wheel with heavier tread and flange can be made within the standard weight limit. It is manifest that any maker altering his standard patterns to furnish the heavier tread and flange must cut them down somewhere else or leave the reduction to be accomplished in the process of ramming and molding in the foundry—a very dangerous method.

Better Iron Mixtures.

The question of mixtures of iron required to make a good wheel is being considered, but the experience of makers that have supplied wheels on specified mixtures has never been satisfactory. One of the large railroad systems specified mixtures for many years, publishing elaborate tables of mileage results, but in due course this practice reached the point where the mixture of iron specified could not be purchased at market prices, for the price paid for the wheels. Although this was known to the railroad in question orders were placed for some years on the old basis. No mixture, however good, will make good wheels without proper and experienced shop practice.

The Question of Chill.

The manufacture of chilled car wheels is unlike that of any other foundry product. To make wheels that will give sufficient mileage and pass tests for depth of chill the operation is always up to the limit of chilling quality in the iron, and thus many causes not properly regulated will increase hardness to the point where safe wheels cannot be made. These variations in chilling quality or hardness of mixture are constantly occurring in the operation, even when the same mixture of iron is used, and are due to slight variations in the quality of coke used for melting, to variations in charging the cupolas and to other causes, any one of which is sufficient.

It is only by constant vigilance and a proper and experienced knowledge of the work in hand that these matters can be controlled. After the molten iron leaves the cupola the time occupied and the method and care used in casting the wheel are equally important. The conditions are such nowadays, often a necessary result of using labor saving devices, that when any interruption occurs the molten iron is not properly handled to and cast into the mold, with the result that the wheel made from it is not of proper quality. After the wheels are made the same general conditions apply as to the process of handling to annealing pits, cooling, annealing, &c.

Cheapness the Ruling Motive.

It may be said that similar conditions apply to any mechanical operation. This is true; but no other mechanical operation of like importance or magnitude has to be conducted under the rigid rule of low cost that controls the making of chilled car wheels. There is no room for progressive or experimental work at the prices paid, and although a capable wheel maker can do business in good times successfully, if he has sufficient output, the important fact is that the whole operation has gradually progressed to the point where under the average practice, in the average business condition, it is not possible for the average wheel manufacturer to turn out proper wheels at the price paid.

This fact does not in the least prove that the chilled wheel has reached the limit of its efficiency. It simply proves that the limit of theoretical economy in the purchase and use of car wheels has been reached and that there is but one remedy that must be applied as a precedent to all others: that is to pay the price that will enable the production of wheels from good material made in a proper manner. Just how soon it will be possible for railroads to bring about such a change in the general practice, or whether it will be possible to do it at all, remains to be seen.

The condition is so grave that it may call for the attention of those higher up, and then the practical officials may feel disposed to deal with it more freely. There is not the slightest doubt of one fact—that no argument and no amount of discussion will begin to produce the

desired and actually necessary result until all the important factors in the present situation are squarely recognized and dealt with.

A Matter of Grave Concern.

It does not profit the railroads to maintain any theoretical order of practice in such an important matter. It will cost far more in life and property to do so than to get down to the real facts and remedy the trouble. And it does not pay the wheel manufacturers, large or small, to consider and act on this subject from any standpoint but the right one. No advantage of competition, no securing of larger orders, can compensate for the responsibility and risk of making and selling wheels that are not equal to the service.

That the chilled wheel can be made of a quality and kind fully equal to any demands upon it in present service is certain, but it must be properly made and properly used.

The question is not, who can escape the responsibility for not arriving at this result? but how soon can the result be accomplished? And there is no one connected with the operation of railroads in any position, high or low, that should not be concerned as a result of the conditions described. There are many wheels in use which are absolutely unsafe, sure to fail at some time, undoubtedly to bring loss of life and property as the result. The matter has passed the point of theoretical discussion and reached that of vital concern to every one interested, either as entitled to reasonable protection of life in traveling or as responsible for the safe operation of railroads.

Increased Duties on Mexican Imports.

As indicated in *The Iron Age* of April 16, an increase in the import duties on iron and steel and a number of other products will, in all probability, soon be imposed by the Mexican Government. The nature of the pending changes in the customs tariff of that country is set forth as follows by a Mexican journal:

"The Mexican Department of Finance has submitted to Congress a bill for the increase of import duties on certain classes of merchandise. The Department states that, as a result of the monetary reform and the firmness in exchange rates, imported merchandise is sold cheaper than heretofore, the home industries suffering in consequence from foreign competition. Various industries have complained, and have made applications for a raise in import duties, and while the Department has been unable to take into consideration all the changes proposed by the Mexican industries, the most important have been given careful attention by the Government.

"Changes are made in the import duty on jute and jute manufactures, chewing tobacco, iron and steel, ordinary lime, Roman and Portland cement, benzol, cotton clothing, antiseptic cotton, common salt, and carriages.

"The present duty on steel is $5.50 per 100 kilos. The bill asks for a raise to 6 cents a kilo, which makes an increase of 50 cents per 100 kilos, or 6 pesos per ton.

"The duty on iron and steel in common bars will be 6 cents per kilo, instead of being 5½ cents. Iron and steel bars having some particular design will pay 7 cents per kilo. Iron and steel rails, weighing 10 kilos or less per meter, will pay $25 per ton, instead of from $10 to $20, as they now pay. Screw plates and nails for rail connections will pay 4 cents per kilo.

"Iron and steel bars for construction will pay from 3 to 5 cents per kilo.

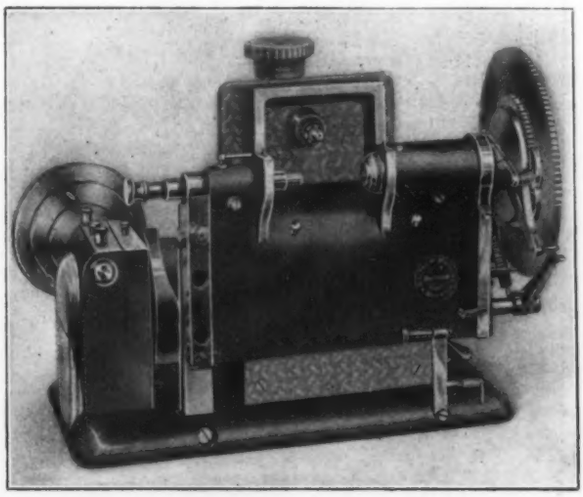
"The duty on cement will be increased from 55 to 70 cents per 100 kilos."

The iron ore production of Russia in 1907 is reported by the German consul-general at St. Petersburg to have been larger than in any other year. Excluding the manganese ore exported from Poti, it amounted to 262.1 million poods, or about 4,400,000 metric tons, as compared with 236.4 million poods in 1906. The amount exported was 60.5 million poods, as compared with 33.3 million poods in 1906. The South Russian metallurgical works received some 5.2 million poods more iron ore than in 1906, but the stock on hand at the end of 1907 was 31 million poods, as compared with 10 million poods a year previously. A pood is 36 lb. avoirdupois.

A Waltham Automatic Clock Gear Cutter.

The automatic gear cutter shown in the illustration is designed primarily to cut brass gears such as are used in clock and similar movements. It can also be used, however, to cut iron or steel gears of fine pitch, and, by the use of heavier spindles, gears as coarse as 24 pitch. A number of its mechanical principles are the same as those of the pinion cutter described in *The Iron Age*, Jan. 30, 1908, and also built by the Waltham Machine Works, Waltham, Mass.

All the movements of the machine are controlled by a cam shaft, which is driven through a worm and worm gear. The cutter spindle is made to endure a high speed and the slide carrying it is automatically lifted



A Machine for Cutting Small Gears, Built by the Waltham Machine Works, Waltham, Mass.

during the return stroke of the work slide, so that the indexing can be done without loss of time. This in connection with the quick return gives the machine a high rate of production, which may be further increased on gears than can be cut in a stack by providing duplicate arbors, so that one can be loaded while the other is in the machine.

An index 10 in. in diameter is used and on account of its proportionately large size very accurate divisions of the work are obtained. A range from 12 to 240 teeth can be had by providing the necessary indexes. The largest diameter that can be cut in brass is 3 in., but for steel work this can be increased to 4 in., because the protection from chips ordinarily provided is unnecessary. Provision is made for an attachment by means of which the machine will cut twice around the work before stopping, and also shift the depth of cut the second time around. This is unnecessary in ordinary work, but it is desirable where very smooth teeth are required.

The protection of the index and cams from chips is a feature, and is afforded by a scraped plate attached to the cutter slide and fitting closely to the hood of the work carrying slide. The hood has a detachable cover, shown at the left in the illustration, which, when in place, causes the chips to fall directly in front, where they can be removed easily. The opening of the hood at the back is large enough to allow for the longest movement of the slide and for the highest position of the cutter. When the cover is removed, which is accomplished by simply lifting it from the locating pins, there is ample room for removing and replacing the work and to see to the setting of the cutter on the center.

The Wilmarth & Morman New Combination Grinder.

A combination drill, cutter and reamer grinder known as style BX and made by the Wilmarth & Morman Company, Grand Rapids, Mich., is shown in the accompanying engravings. Beyond saying that the drill grinder is the familiar New Yankee type with its time consuming adjustments practically eliminated, there is scarcely need of further description. The machine can be furnished with a range of drill grinding capacity adapted to the range of drills in use in various shops. The cutter grinding attachment is of substantial weight and is firmly attached to the main column of the machine. Fig. 1, which is a view of the complete machine as seen from the cutter grinding attachment side, shows clearly the type of drive employed. The bearings, ways and all constructional features, it is claimed, have received the careful attention necessary to insure convenience and generally satisfactory service, and for almost all cutter grinding

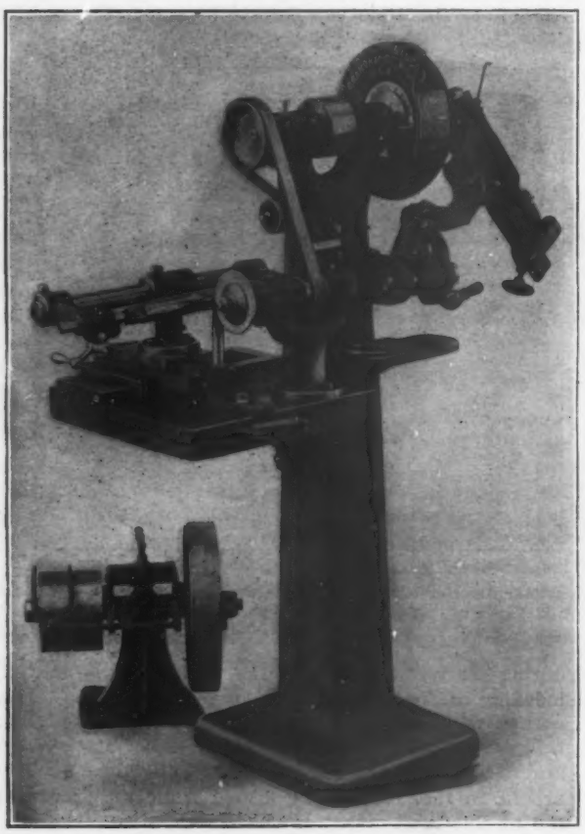


Fig. 1.—The Style B X Drill, Cutter and Reamer Grinder Made by the Wilmarth & Morman Company, Grand Rapids, Mich.

the machine is declared to be as convenient as a grinder specially intended for that class of work.

The manner in which the machine is set up and operated for grinding face and side mills is indicated in Fig. 2. The grinding is performed by sliding the work past the face of the wheel, to effect which movement a convenient lever is provided. Fine movements of the cutter to and from the wheel are made by a screw adjustment, and the clearance can be readily regulated as desired. Face and side mills up to 12 in. in diameter can be handled by the cutter grinding attachment.

Angle cutters are ground in much the same way as side mills, except that, as Fig. 3 shows, the head which carries the cutter is swiveled to the desired angle. To facilitate this the circular base of the head is graduated in degrees. The illustration shows a 45-degree double angle cutter in position, but cutters of any angle can be ground and of any diameter up to 8 in.

The gear cutter grinding device, which is shown in Fig. 4, possesses a universal adjustment that provides convenient means of grinding gear cutters correctly. The sliding

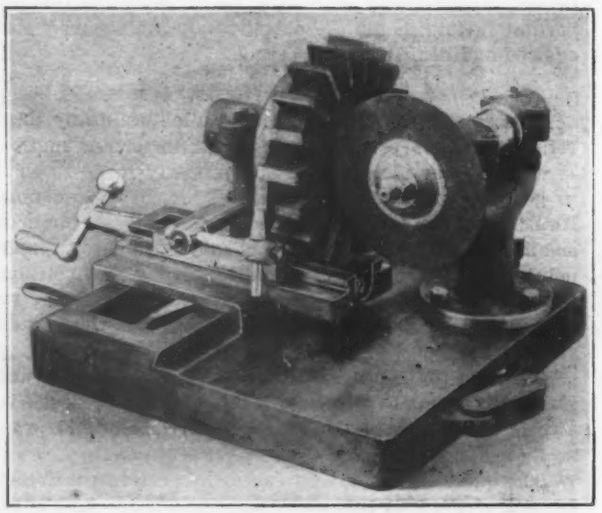


Fig. 2.—Setting for Grinding Face and Side Mills.

table is first set so that a radial line from the center of the cutter intersects the grinding edge of the saucer-shaped wheel. This position of the slide is fixed by a thumb screw. By a micrometer adjustment the cutter is elevated so that it centers in hight with the center of the wheel. The gauge is then set in the position which corresponds with the grinding edge of the wheel and while the face of the tooth is thus retained the spring index dog

Fig. 3.—Setting for Grinding Angle Cutters.

is clamped in position as shown. The grinding movement is controlled through a screw, a couple of turns of the handle of which passes the work in and out once for the grinding of each tooth. The capacity of the device includes gear cutters up to 6 in. in diameter.

The grinding of reamers is illustrated in Fig. 5. The swivel base makes it possible to grind reamers either parallel or with any required taper. The reamers may also have either straight or spiral flutes up to 8 in. long and the diameter capacity is also 8 in. Ordinary straight

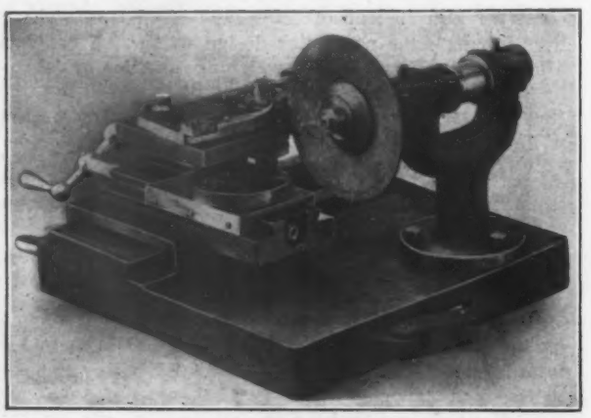


Fig. 4.—The Gear Cutter Grinding Device.

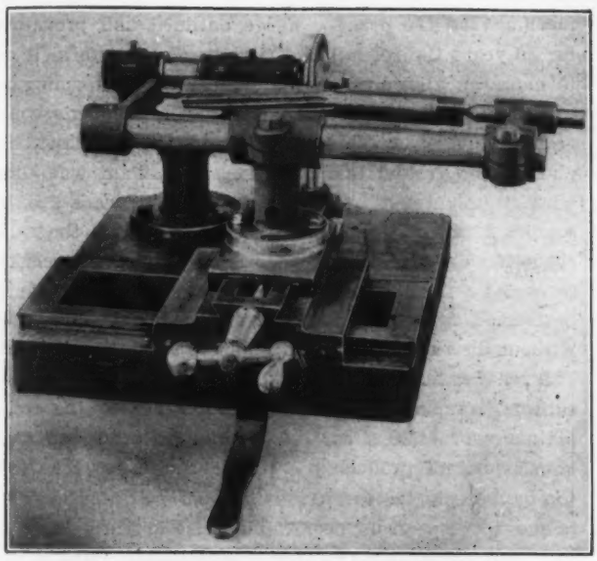


Fig. 5.—Setting for Grinding Reamers.

or spiral milling cutters are ground in the same way as is shown in this illustration for reamers.

The New Currency Act Epitomized.

As passed by Congress, May 31, the new measure starts with a provision for note currency based on commercial paper. This is to be issued by "national currency associations," to consist of banks 10 in number, and with a combined capital and surplus of at least $5,000,000. Such associations are to be organized in substantially the same way as the "clearing house associations" of the old Vreeland bill. The notes, however, are not to be allotted to banks unless the latter already have out notes based on national bonds and equal to at least 40 per cent. of their capital stock. When issued the notes shall not equal more than 75 per cent. of the paper and securities deposited with the association. The issue may, however, be raised to 90 per cent. of the securities deposited, which are State, county or municipal bonds.

In any case the notes issued are not to exceed 30 per cent. of the capital and surplus, while the term "commercial paper" is to be limited to notes with two responsible names, running not over four months. The banks are to be jointly and severally liable for the notes issued, and in case any bank lets its redemption fund in the Treasury run down the department may fall back for cash by a complicated method, upon the other banks in the national currency association to which it belongs.

The provisions of the Aldrich measure are seen in section 3, which provides that banks of the classes already specified may take out notes based on State, county and municipal bonds to the extent of 90 per cent. of such bonds deposited with the Treasury. This will figure out about the proportion of 60 and 40 per cent., or $300,000,000 and $200,000,000, as announced yesterday. The banks are to keep with the Treasury 10 per cent. of the new circulation taken out under the terms of the bill, such 10 per cent. to be used and treated the same as the redemption fund now held by the department against the old notes.

The maximum issue of notes is to be $500,000,000, and the issues are to be apportioned to the several States by the Secretary of the Treasury so far as possible in proportion to capital and surplus of the national banks in each State. The tax on the notes is to be 5 per cent. the first month, rising at the rate of 1 per cent. per month to 10 per cent. When presented at the Treasury the notes are to be redeemed in lawful money. Government deposits in banks are to pay interest at not less than 1 per cent. per annum. The national monetary commission is to be organized substantially as originally provided in the Aldrich commission bill.

On May 11 No. 4 Ensley Furnace of the Tennessee Coal, Iron & Railroad Company, at Ensley, Ala., broke the record at that plant by producing 414 tons in 24 hours. The best previous record was 403 tons, made March 31.

April Exports and Imports of Iron and Steel.

The report for April of the Bureau of Statistics of the Department of Commerce and Labor presents no marked changes in exports and imports of iron and steel. The total value of such exports shows a continuance of the increased outward movement, while the figures for imports indicate that the diminution of the inflow has not been checked. The total value of the iron and steel exports, not including ore, for the month of April was $15,467,319, against $15,165,910 in March, $14,069,249 in February, and $13,643,828 in January. Taking the commodities for which quantities are given, the total for April, a 30-day month, is 93,522 gross tons, against 96,437 tons in March, 81,755 tons in February, and 74,352 tons in January. The following table gives details of the exports of such commodities for April and for the 10 months of the current fiscal year ending with April, as compared with corresponding periods of the previous year:

Exports of Iron and Steel.

	April.		Ten months.	
	1908.	1907.	1908.	1907.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	5,153	8,211	43,991	71,701
Scrap	2,929	3,786	16,040	14,392
Bar iron	302	1,161	11,810	38,765
Wire rods	713	626	5,671	9,021
Steel bars	3,494	8,485	57,289	36,451
Billets, blooms, &c	3,822	8,867	83,482	102,811
Hoop, band, &c	331	78	8,115	5,272
Steel rails	20,999	40,293	252,315	261,238
Iron sheets and plates	3,050	4,234	35,692	24,234
Steel sheets and plates	4,347	9,825	51,463	81,724
Tin and terne plates	5,095	1,882	12,766	6,131
Structural Iron and steel	13,741	13,724	120,788	103,799
Wire	13,610	14,846	134,467	138,666
Cut nails	1,039	1,202	5,366	6,554
Wire nails	2,253	4,195	32,643	33,277
All other nails, including tacks	313	566	5,036	5,651
Pipes and fittings	12,331	10,811	150,755	105,038
Totals	93,522	132,792	1,027,689	1,044,725

Turning to the imports, it is found that the total value of iron and steel imports, not including ore, for April was $1,633,812, against $1,696,800 in March, $1,697,525 in February, and $2,076,766 in January. Taking the commodities for which quantities are given, the April total is only 12,342 gross tons, against 15,885 tons in March, 19,054 tons in February, and 28,008 tons in January. The following table shows the details of the imports of these commodities for April and for the 10 months of the current fiscal years ending with April, as compared with corresponding periods of the previous year:

Imports of Iron and Steel.

	April.		Ten months.	
	1908.	1907.	1908.	1907.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	3,003	61,304	189,776	453,685
Scrap	111	1,408	17,077	14,654
Bar iron	830	1,189	31,345	31,244
Rails	417	400	2,626	3,924
Hoop, band, &c	26	10	463	4,068
Billets, bars, and steel in forms n.e.s	797	926	14,582	16,156
Sheets and plates	245	247	2,230	3,024
Tin and terne plates	6,155	6,468	48,538	51,875
Wire rods	706	1,395	11,831	14,530
Structural Iron and steel	52	338	1,418	8,925
Totals	12,342	73,685	319,886	602,085

The imports of iron ore in April were 48,153 gross tons, against 52,729 tons in March and 80,094 tons in February. All but 96 tons of the April imports came from Cuba.

The total value of all kinds of exports of iron and steel, not including ore, for the 10 months ending with April was $161,034,823, against $149,710,569 in the corresponding period of the previous year. The total value of similar imports for the 10 months ending with April was $24,500,926, against $32,795,503 in the corresponding period of the previous year.

THE IRON AGE

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Terminal Railroads at Iron and Steel Works.

An interesting question has arisen, following the vigorous campaign against rebates by railroads either by direct refund or by the indirect method of unwarranted allowance for switching on terminals owned by shippers, or of low special rates given to shippers furnishing their own cars. Argument was made before the Interstate Commerce Commission recently on a matter involving a discrimination by carriers in their treatment of shippers having their own terminal facilities. The outcome naturally to be expected is that the railroads will be required to discontinue certain allowances made for work performed by manufacturing companies in switching and spotting cars, or to grant compensation on equal terms to all shippers doing such work.

For about 30 years it has been the custom in certain iron producing sections for the railroad carriers either to do themselves the work of switching and spotting loaded cars consigned to or shipped by blast furnace companies, for example, at such places in the yards of the companies and at such times as the manufacturing company directs. Thus the furnace company would have its iron ore, coal, coke and limestone spotted at the point of consumption without charge other than the established tariff rates. A different form of the same custom has grown up in connection with very large plants, such as those of steel companies having their own blast furnaces. The intricate track systems needed at such plants and the extent of the internal traffic would make it inconvenient for the railroad to go into the yards and spot inbound material or cars having outbound product, as required by the industrial company. The latter in a good many cases has organized a terminal railroad company, which does the work of switching and spotting cars for an allowance of, say, $2.50 a car made by the carriers in proportion to their participation in the freight rates. This has applied to practically all inbound material and outbound product on which the freight rate is 50 cents a ton or more. One instance is known in which the railroad company and the manufacturing company agreed upon a per diem allowance representing the actual cost to the terminal railroad of doing the work.

Some time ago a furnace company in the Central West brought a complaint against a railroad before the Interstate Commerce Commission. The furnace company had provided terminal tracks of its own, but the railroad company had refused either to perform the service referred to or to make an allowance to the terminal railroad for doing the work. It was alleged that inasmuch as the practice above outlined had prevailed for 30 years the refusal of the railroad to perform it or to make an allowance to the shipper for performing it constituted a preference in favor of the shipper's competitors and was therefore discrimination against its plant. The ground taken by the complainant was that while it might not have been possible 30 years ago to compel a railroad to furnish such service, yet the railroads having seen fit to render it as part of the service covered by their regular rates, or to pay for it where performed for them, they must afford it equally and without discrimination to all shippers similarly situated. The relief asked for was that the commission require the railroad companies to make an allowance to the complainants of $2.50 a car on inbound material and outbound product producing a net revenue of 50 cents a ton or more to the carriers, or compel the railroad companies to cease from performing this service or paying for it to competitors of the complainant. Two other cases were brought in which the same general issue was joined, but they differed from the one cited above in that no charge of discrimination in favor of competitors was made, the shipper through its terminal railroad company demanding an allowance from the railroad company merely on the theory of *quantum meruit*, claiming that it rendered a service to the railroads and should be paid for it.

The position taken by the railroads before the Interstate Commerce Commission was that the complainant industrial companies had provided their own terminals for reasons of their own, without any reference to the railroad, and that the railroad had performed all the services it was legally bound to give when it delivered cars within the property line of the shipper.

The question involved is one of many arising under the new régime which gives so large a discretion to the Interstate Commerce Commission. It suggests the wide swing that has been made from the time when the railroads readily granted inordinate advantages to the owner of a terminal railroad to this day of their unwillingness to yield up a jot beyond the requirements of the constituted authorities.

American Patents and Trademarks in Japan.

It is officially stated that negotiations between the United States and Japanese governments relative to conventions which will secure protection to American patents, trademarks and copyrights in Japan and Corea have been brought to a satisfactory conclusion and that a treaty on the lines of those existing between this country and other important nations will become operative in the near future. Protection for American ideas in Japan has long been needed. There have been flagrant cases where patents and trademarks have been deliberately appropriated by Japanese manufacturers and merchants. American inventions, protected by patents at home and in those countries with which we have treaty relations, have been patented by Japanese in their own country. American trademarks have been similarly registered, to the consequent exclusion of the products which rightfully bore them. In one case a manufacturer of firearms discovered that a Japanese jobbing house which had been acting as his agent, but which had given up the line, had registered his trademark, which is one well known throughout the world, and is consequently a valuable trade asset. When it was decided to place the line with another house the fact was brought to light that the

American firearms could not be sold in Japan under the trademark, because to do so would be in violation of the trademark as registered by the native merchant. Other complaints of this character have been frequent. Manufacturers in other countries have suffered similarly. The Japanese have proved themselves marvelously well equipped to adopt or adapt the ideas of others, and at the same time their business ethics differ from ours.

While details of the proposed treaty are not available, it is probable that its operation cannot be retroactive. Patents and trademarks lost to Americans in the past cannot be restored unless the treaty provisions differ from those with other countries. Priority of date of patent or trademark will count for little. But in the future Americans will be protected; the Japanese courts will doubtless see justice done. An important element of business friction and distrust will then disappear.

Arbitrating Machinery Trade Disputes.

In accepting the principle of arbitration in the settlement of differences between its members, the National Machine Tool Builders' Association has established itself in a new and important usefulness, especially in disputes arising from patents. The recommendation of the Committee on Resolutions, which was adopted by the association, provides that members shall refer their disputes to an Arbitration Committee consisting of one member chosen by each of the interested parties and a third selected by the original two. This is the common arrangement when arbitration is made the means of bringing about an equitable settlement of business contentions, and is undeniably a fair one.

The history of the American machine tool trade covers a number of instances in which litigation between manufacturers now belonging to the association have been carried to costly lengths in the courts. The patent laws are conducive to protracted legal contests. Probably no shorter cut to the determining of the rights of the parties is feasible, but however that may be, a patent case is notoriously expensive. If it can be avoided, the litigants are spared serious expenditures, which must be figured into their overhead costs and thence into prices and margins of profit. Occasionally there is a case that cannot be handled outside of the courts because the issues are so very important that a final decision is essential to the complete establishment of the patent. With certain inventions, notably those where basic claims are allowed, a test case in the courts may be considered as a necessary part of the patent proceedings, and may even be courted by the owner of the invention.

Usually, however, disputes between members of an engineering trade may be settled as satisfactorily before a fair minded Arbitration Board as in the courts. The expense must be decidedly less, while the saving of time is another important consideration. As between members of an association which already includes by far the greater number of the important people of the trade, and which continues to grow in size, the settlement of one dispute would establish a precedent that would probably be followed generally. If a member should claim that another is infringing upon a patented feature, and an Arbitration Committee should uphold the contention, then other members would abide by the finding, and either avoid the use of the mechanism or else arrange some basis of royalty or shop rights. The same general condition exists in the use of trademarks, and even copyrights, where trade literature is copied to the detriment of the interests of its originator. These are not the only possible contentions in which the Arbitration Committee might be employed to advantage. Even disputes over causes for which the courts provide no redress might be handled in this way, as, for example, where one member is hiring men from another, disrupting his working force, which may be fair enough from the standpoint of cold business, but which at the same time may constitute a source of just complaint as between members of an association that is working for the common good of a great branch of industry. Then there are those cases where laws are involved, but where the issues are not of sufficient magnitude to warrant the expense of going to the courts. Naturally, ill-feeling is engendered in even such minor matters, which is the more enduring because no settlement is ever reached.

It should be simple enough to develop the machinery of the arbitration system for practical operation. The parties in dispute may deal directly one with another, which would usually be possible, or the official board of the association may use its influence to bring about the disposal of the case through the medium of a committee tribunal. Circumstances must govern the individual case. There can be nothing binding upon the members to compel them to arbitration, but the method is one that should appeal to the business instincts of most manufacturers, because of its economy of time and money. The results of the association's existence have made this possible. Friendliness is now a factor in the machinery trade. The antagonism which has sometimes characterized the relations of rival manufacturers in the past has been eliminated to an astonishing extent. This is likewise the condition in other engineering and metal trades, though it is not yet universal. The trend is sharply in the direction of co-operation, and there are few ways in which this phase of business relationship may be better directed than in the settlement of trade disputes by friendly arbitration.

The Case of the Chilled Car Wheel.

The developments at the recent conference in New York of car wheel manufacturers and representatives of railroad operating departments are the occasion of the article printed elsewhere, which Mr. Griffin has prepared at our request. Hackneyed as the car wheel discussion has come to be, this further statement of the case is timely, in view of the consideration car wheel specifications will have at the railroad conventions this month. Much as has been said, repetition is still in order so long as a question of so much moment to the railroads, the wheel manufacturers and all who travel, is so far from satisfactory settlement. The fact that the passenger car wheel is not in itself a part of the problem does not eliminate the traveling public as a party in interest, for there are the well known possibilities of accident to passenger trains from wheel failures on freight trains traversing adjoining tracks.

We referred some time ago to the wheel problem as differing from the rail problem both in its conditions and its treatment. While the rail has had none too much attention, albeit railroad comment has been at times most ill considered, the real awakening to the seriousness of the car wheel situation has come late. What Mr. Griffin writes, out of his experience as a car wheel manufacturer, gives the impression that while some palliatives have been employed at times, the cure for the combination of maladies from which the chilled car wheel trade has long been suffering has not been found. Furthermore, if found, there are apparently a long road and many obstacles between its discovery and its application. Yet when it is considered that out of apparently irre-

concilable differences between the railroads and manufacturers a way was made to agreement on a new steel rail specification, the car wheel situation is not to be given up as hopeless. Thus far the railroad purchasing department has had a preponderating influence. The technical staff, as the recent New York conference indicated, is aroused to a new sense of the gravity of the situation. What is yet to come is the attacking of the problem by the highest railroad authority and the elimination of those administrative practices that in so many cases have put cheapness before the highest wheel quality and the highest attainable degree of safety.

The Protection Movement in England.

What are known as special elections in this country, elections due to the resignation or death of a member of Congress, are known as by-elections in England; and when a by-election is contested it arouses a keen and widespreed popular interest quite unknown in this country in connection with a special election to the House of Representatives. The general election in England took place in January, 1906. Between that time and the end of April there had been 38 contested by-elections, in which two seats were captured by the Labor party from the Government, and six seats were regained by the Tories and protectionists. The question of protection was to the front at many of the more recent of these by-elections, particularly at Worcester, northwest Manchester and Dundee.

The Contest in East Wolverhampton.

But of all the by-elections since 1906 there has been only one in an exclusively iron and steel manufacturing constituency. This was the election which took place for the division of East Wolverhampton at the beginning of May, where there was a vacancy due to the promotion of Sir Henry Fowler to a peerage. Fowler is a free trader, and at the general election in 1906 he carried the seat by 2865 votes in a constituency in which there are 10,000 electors. Wolverhampton for more than 70 years had been an absolutely safe Liberal seat, and it easily fell again into Fowler's possession at the general election, in 1906, when Chamberlain's policy of protection and colonial preferences was for the first time submitted to the whole of the British electorate.

At the by-election last month protection was again the leading issue. The Government's education policy, to which Episcopalians and Roman Catholics all over England are hostile, and its licensing bill, which has aroused the bitter opposition of the brewing and liquor retailing trades from Berwick-on-Tweed in the north to Land's End in the southwest, were of the issues of this Wolverhampton contest. But the Tory candidate—L. S. Amery, who is of the *Times* staff—from beginning to end of the campaign laid most stress on the question of protection. Willenhall, the largest center of the lock making industry in England, is within the division of East Wolverhampton. The lock trade just now is bad; and other of the lines of builders' hardware, as well as the hardware industry generally, are suffering from the prevailing depression in English trade. The lock making industry, in particular, is so bad, that many of the men are not earning $2 a week. The Tory candidate attributed all these conditions to the lack of a protective tariff in England and to the protective tariffs of the United States and Germany.

The Liberal candidate's answer to this was that depression in trade was not confined to England—that it was more acute and more widespread in Germany and in the United States than it was in England. Moreover, the free traders at Wolverhampton laid stress on the fact that the Chamberlain Tariff Commission—the nonofficial commission of inquiry that was appointed as part of the protectionist propaganda—recommends a duty of 6¼ per cent. on steel bars, and 10 per cent. on iron and steel sheets. Such duties on imported raw material, it was insisted, would greatly hamper the Willenhall District in its oversea trade, and tend also to reduce the home demand for its products.

The Protection Candidate Loses by Only Eight Votes.

A two weeks' campaign preceded the polling. Protection was more persistently discussed than at any recent by-election; and instead of being discussed on general lines, as had been usual, it was discussed almost exclusively from the point of view of the different branches of the iron and steel industry of Wolverhampton. The free traders had almost everything in their favor. The Liberal candidate was a local man, while the Tory was a carpet bagger. But it was only by eight votes, in an election at which over 9000 votes were polled, that the seat was retained for the Liberal and free trade candidate.

Protectionists all over the country were almost as gratified with Amery's heavy poll of votes as though he had carried the seat. It is their most outstanding "moral victory" since Chamberlain announced his new policy in May, 1903; and taken in conjunction with the successes which the Tories and protectionists have achieved at the by-elections since 1906, it is good proof of the headway which the protectionist movement is making to-day in England.

The English Protectionists and the Colonies.

With the recent gains for the protectionist movement there has come a change in the English propaganda that has so far received little or no notice in the American daily press. From 1903 to 1906 most emphasis was laid on Chamberlain's wholly unfounded conviction that the British colonies, and Canada in particular, would at once let down their tariff bars to British manufactures if Great Britain would tax foodstuffs from the United States and other non-British countries, and admit these products from the Dominion and other British colonies duty free. The underlying idea of Chamberlain's scheme was to enlarge the market for British exports in the colonies, and set up preferences for colonial products in England. Empire was behind the idea; and it was on the value of the plan as a means of knitting the Empire together that most stress was laid in Parliament, on the platform, and in the press between May, 1903, and the general election in 1906.

But since then Canada has revised its tariff, and in so doing has imposed higher duties on many British imports that were levied under the preferential tariff of 1897. Australia also has followed Canada's example, both as regards high duties on British imports, and bounties in aid of the iron and steel industry at the antipodes. Information as to these changes is gradually percolating into the British mind; with the result that at these recent by-elections less was heard of the lowering of colonial tariffs in return for preferences on colonial products at British ports than at any time since Chamberlain five years ago took England by surprise with his scheme for the abandonment of free trade.

It is just as well for the English people that the colonial position is at last becoming popularly understood, for there would be nothing but disappointment and heart burning if Great Britain adopted protection, and stood ready to set up preferences for the colonies, and the colonies were then to inform the other country that they had nothing to concede in return for these preferences. That they would concede nothing of value to British manufacturers can be judged from a recent pronouncement on the subject from the Canadian Manufacturers' Association, the organization which 11 years ago was completely successful in inducing the Liberal government, then newly in power at Ottawa, to abandon every fiscal and economic principle that the Liberals had advocated while in opposition in the Dominion Parliament from 1879 to 1896. The message to England, sent at this juncture in the tariff controversy there by the Canadian Manufacturers' Association, through its organ, *Industrial Canada*, reads as follows:

> The policy of Canada, backed up by the vast majority of the people of this country, is to build up our own manufacturing industries, and no country, not even Great Britain, can hope

to cater to this market on even terms with our own people. Canada has already done all that can fairly be expected of her for the British manufacturer; and if a preference for Canadian products in the British market depends upon further concessions from Canada, it is to be feared that there will never be a preference. The preference already given has been a serious blow to some lines of Canadian manufactures, and the chances are all in favor of its being wiped out, so far as these lines are concerned.

Chamberlain had paid only a flying visit to Canada before he became Colonial Secretary. He was there for a few days in 1898; but this was five years before he turned his attention to breaking down the free trade system of England. Of Canada he knew next to nothing at first hand when he launched his new scheme in 1903. Had he known more of it he would never have framed his new scheme on the lines he did; and it would not have been necessary for the Canadian Manufacturers' Association to send to England in May, 1908, the message from *Industrial Canada*, that there are to be no more concessions in the Dominion tariff to British manufacturers, with the curt intimation to British tariff reformers, with which the message is concluded, that "preference, like charity, should begin at home." E. P.

The Status of American Manufacturers in the Philippines.

Wm. C. Gregg, president of the Gregg Company, Ltd., Newburgh, N. Y., takes exception to the appeal for free admission of Philippine products made by John Stryker Hord before the Machinery and Supply Convention at Richmond, Va., May 13. Mr. Hord's address was published in *The Iron Age* of May 21. Mr. Gregg spoke on this subject before the convention of the National Association of Manufacturers in New York City May 19, offering also the following resolution, which was adopted:

Resolved, That the National Association of Manufacturers is opposed to opening the United States markets to free importation of the products of the Philippine Islands, as long as the American manufacturers are not given the same tariff protection in the Philippine Islands that they have in the other tropical possessions of the United States.

Mr. Gregg's address in support of his resolution was in part as follows:

The Philippine Islands Have Their Own Tariff.

"The United States tariff is not in force in the Philippine Islands, but Congress has enacted a special tariff for the islands, which is levied against the imports from the United States on the same basis as imports from other countries. This Philippine tariff is enacted for the purpose of raising revenue to run the Philippine Government, and is drawn up with little or no regard to any interests except those in the islands.

"I am very sure I will surprise my hearers by stating that the Filipinos are buying agricultural machinery in Europe, and importing it into their islands under a duty of only 5 per cent. ad valorem. The people in the United States, Hawaii, or Porto Rico, who wish to import similar machinery from Europe, have to pay 45 per cent. duty. Let me quote from the Philippine tariff the paragraph covering the machinery in question, that I may be thoroughly understood.

"'Sec. 245. Agricultural machinery and apparatus, machinery and apparatus for pile driving, dredging, hoisting and making or repairing roads, for refrigerating and ice making, sawmill machinery and apparatus for extracting vegetable oils, and for converting the same into other products, for making sugar, for preparing rice, hemp and other vegetable products of the islands for the markets, and detached parts therefor, also traction and portable engines and their boilers, adapted to and imported for and with rice-threshing machines, and steam plows, 5 per centum ad valorem.'

"Before further discussing this paragraph, I wish to say I do not propose to touch on the great American tariff question at all. The arguments for high and low tariff are entirely foreign to the point I wish to bring before the American people at this time.

"I am not taking a position antagonistic to the free admission of Philippine products into the United States, except as such acts, coupled with the present Philippine tariff, would work hardships on the American manufacturers. Take the sugar industry, for example. You will note in the quoted section the three words, 'for making sugar,' and if you will look back in the paragraph, you will see this refers to 'machinery and apparatus.' If we should open our sugar markets and allow Philippine sugar free entry to the United States, there is no reason why it should not cause as big a boom to the island sugar business as was caused by similar tariff treatment to Hawaii and Porto Rico. The machinery for making sugar bought by Hawaii and Porto Rico, made a large amount of business, and is still making it, scattered all over the United States from San Francisco to Philadelphia.

"There is no reason why this section might not be made to cover an entire sugar mill, costing, including structural material, corrugated iron, glass foundation, building hardware and all equipment, from $200,000 to $1,000,000. The first requisite in making sugar is a mill, and mills are made in Germany and England as well as the United States, and shipped to various tropical countries encircling the globe. The promoters of Philippine plantations would buy their machinery in the cheap markets of Europe, because they would have to pay a duty of only 5 per cent. to enter it in the Philippine Islands. If I owned a plantation in the Philippines, I would certainly do the same thing under such conditions.

"The reports of the Treasury Department at Washington show that for the six years 1901 to 1906 we bought 40 per cent. of their products, while they gave us 15 per cent. of their trade.

"You understand that in admitting Philippine sugar free of duty we take so much revenue out of the Treasury of the United States. It is interesting to think where this money will go: 1. The moment such a bill passes Congress and is approved, the value of all good sugar land in the Philippines will double at once. Much of this land is held by foreigners; I mean by others besides native Filipinos, and they, on account of their business acumen, will be the principal ones to organize and get the money from the United States Treasury. 2. The Chinese merchants, or middlemen, both in Manila and in China, are the ones who buy and handle the Philippine sugar. 3. The European manufacturers of sugar machinery.

An Unfair Course to American Manufacturers.

"It seems strange to me that such an unfair course to American manufacturers should be persistently advocated by a number of very intelligent Americans. It is because they have become so unselfishly interested in the Philippine Islands, and have become so much imbued with the missionary spirit of giving freely to those whom we wish to help, that they have quite lost sight of the United States bread-and-butter side of the question, and I think they have quite lost sight of the large proportion of the profits which would go, not to their proteges, the native Filipinos, but to the sharp business men of the Orient and Europe, to whom I have just referred.

"It has been urged by Secretary Taft and others that the development of the Philippine sugar business would be very slow and it would be years before it would reach volume enough to affect any interests. Well, let us see. The Hawaiian production of sugar is now almost double what it was at the time of annexation, just 10 years ago. As I was in business there at the time, I happen to know that practically all the mills and machinery to produce this increase were contracted during the first 12 months of annexation; by the same process, millions of dollars worth of machinery would be hurried into the Philippines from Europe if they were given 'free sugar' into the United States.

"Perhaps I would not be discussing the Philippine situation with full candor if I did not lay down some plan for the future of the islands. Those in power seem dissatisfied with the present condition of things. One of two courses is open: The first is to give them free trade with the United States, and extend the United States tariffs to the islands, making them, in all respects, like Hawaii and Porto Rico in their relations to us. The second is to use the ability of the Americans in pointing out to the Filipinos the way by which they can best develop their own resources without regard to tariff advantages with the United States.

"The history of the 10 years of uncertain and timid control of the Philippines would suggest a change to full adoption or education toward independence."

The Standard Screw Company.

W. P. Pearson, in his report as president of the Standard Screw Company, states that before the sudden cessation of business in October the company had fortunately passed through about seven months of the greatest prosperity and seemed in a fair way to fulfill the suggestion in the president's last report that the notes payable of the company might be wiped out. As it was, they were reduced from $375,000 to $160,000. The Standard Screw Company owns the Chicago Screw Company, the Illinois Screw Company, the Western Automatic Machine Screw Company, the Pearson Machine Company, the Worcester Machine Screw Company, the Detroit Screw Works, the Hartford Machine Screw Company and the Walker & Ehrman Mfg. Company.

A summary of the income account for the year ending March 31, 1908, shows a combined net profit of all branches and subcompanies of $512,137.47, to which is added $2045.85 for interest. Deducting $38,001.98 for Standard Screw Company expenses, leaves $476,181.34, from which are deducted $11,750 for bond interest, $11,684.37 for special interest, and $269,634 dividends, leaving a net surplus of $183,112.97. The following shows the distribution of income:

Inventories of raw material and finished goods increased	$4,213.68
Other quick assets (net) increased	27,965.09
Investment accounts increased	131,129.06
Investments—other companies increased	400 00
Debentures purchased	3,000.00
Interest (special) paid	11,684.37
Bond interest paid	11,750.00
Dividends paid	269,634.00
Changes in net quick assets through surplus	16,405.14
Total as per income sheet	$476,181.34

The assets and liabilities on March 31 were:

Assets.

Cost of properties, per books	$4,747,627.61
Investments—other companies	1,636.88
In treasury—company's debenture bonds, 5 per cent	39,000.00
Unexpired insurance and taxes	7,777.88
Interest paid in advance	1,159.33
Inventories of finished product in stores and in process, raw material, supplies, &c	719,804.10
Notes receivable	25,069.09
Accounts receivable	184,247.21
Cash in banks and on hand	160,032.74
Total	$5,886,354.84

Liabilities.

Preferred stock	$2,000,000.00
Common stock	2,494,000.00
Debenture bonds, 5 per cent	274,000.00
Notes payable	160,000.00
Accounts payable	68,807.92
Surplus	889,546.92
Total	$5,886,354.84

Isthmian Canal Cement Bids.

After repeated postponements, the Isthmian Canal Commission, Washington, D. C., June 1, opened proposals for furnishing 4,500,000 barrels of Portland cement for construction work on the Isthmus. Twenty-five proposals were made by American and European manufacturers. Bids offering to supply the entire amount included the following:

Lehigh Portland Cement Company and the Alpha Portland Cement Company, Allentown, Pa., joint bid, delivered at Colon, $8,212,500; delivered United tSates ports, $6,412,500.

F. J. Duggan, New York, delivered at Colon, $7,830,000.

Santa Cruz Portland Cement Company, San Francisco, delivered on dock at Portland, Ore., $6,243,750.

Atlas Portland Cement Company, New York City, delivered on dock, United States, $5,355,000.

All the foreign bids were for quantities less than the full amount required. The bids will be sent to Panama for inspection before any awards are made.

The recent purchase of the Union Iron & Steel Company's bond issue by Rogers, Brown & Co., Cincinnati, means, it is reported, the rehabilitation of Union Furnace at Ironton, Ohio, which secured the bond issue, and the blowing in of that stack as soon as conditions warrant. It will be put on foundry iron. With this new property Rogers, Brown & Co. control 20 furnaces, with a practically complete and absolute ownership of 13. It is understood that the recent purchase by this firm of a large block of Southern iron will be held intact for future profits.

Michigan Copper Production in 1907.

In the recent annual report of James L. Nankervis, Commissioner of Mineral Statistics of Michigan, the copper production in that State is given as 220,217,892 lb. in 1907, a decrease of only 4,377,000 lb., or about 2 per cent., compared with 1906. This decrease is more than accounted for in the Calumet & Hecla output alone, which in 1907 was 88,000,000 lb., a decrease of 7,000,000 lb., as compared with the previous year. The Atlantic mine, which was shut down in May, 1906, owing to serious falls, was not operated in 1907, and endeavors are now being made to reach the vein through adjacent shafts and not under the foot walls, as first contemplated. A notable increase is observed in Quincy, from which much copper came on the market early in the year. In the following table is given the production of the principal mines in both years:

	1907.	1906.
Calumet & Hecla	88,000,000	95,000,000
Quincy	19,796,058	16,194,838
Baltic	16,704,868	14,397,557
Champion	16,489,436	16,954,986
Osceola	14,134,753	18,588,451
Tamarack	11,078,604	9,882,644
Mohawk	10,107,266	9,352,252
Wolverine	9,372,351	9,681,706
Tri-Mountain	8,190,711	9,507,933
Ahmeek	5,510,985	3,077,507
Franklin	4,401,248	4,368,538
Allouez	2,934,116	3,486,900
Isle Royale	2,667,608	2,937,098
Michigan	2,556,365	2,875,341
Centennial	2,373,572	2,253,015
Mass	2,078,677	2,106,739
Winona	1,285,863	278,182
Adventure	1,244,874	1,552,628
Victoria	1,207,337	546,334
Atlantic	.....	1,493,982
Tecumseh	.....	58,008
Miscellaneous	83,200	.....
Totals	220,217,892	224,594,639

The Metal Trades Superintendents' and Foremen's Club of Cleveland, Ohio, was organized on the evening of May 27 at a meeting held at the Cleveland Athletic Club under the auspices of the Cleveland Branch of the National Metal Trades Association. The organization starts out with 75 members. A committee was appointed to prepare a constitution and by-laws, and the organization will be completed at another meeting to be held soon, when officers will be elected. After the banquet speeches were made by James F. Barker, principal of the Technical High School, who spoke on "Industrial Education," by F. W. Siberlin of the Cleveland Twist Drill Company on "Organization Among Superintendents and Foremen," and by C. O. Bartlett of the C. O. Bartlett & Snow Company on the "Employers' View of It."

The incorporation of the Wood River, East Alton & Bunker Hill Traction Company, with offices in East St. Louis, Ill., has been certified for $1,500,000. It is the purpose of the company to construct and operate an electric road extending from Wood River, Madison County, to Gillespie, Macoupin County, Ill., traversing the intermediate towns of East Alton, Bathalto, Moro, Dorsey, Bunker Hill and Dorchester. The company also expects to furnish current for lighting these towns which range in population from 600 to 6000. Preliminary work of securing the right of way and making surveys is practically completed, and it is stated by the secretary, S. B. Knepper, East St. Louis, Ill., that active construction work will be commenced within 90 days. The length of the proposed line is 20 miles.

The Republic's Mining Operations.

DULUTH, MINN., May 30, 1908.—The attitude of the Republic Iron & Steel company as to ore shipments this year is indicative of the general feeling among independent concerns in the ore mining fields. This company has a number of small mines, with some of larger size, but having ore rather low in grade. On the Mesaba range it has the Kinney and Alexander, open pits, and the Pettit, Mariska, Bessemer, Franklin, Victoria and Union, all underground; while on the Marquette it has the Cambria and Lillie, two small underground mines, and the properties of the Antoine Ore Company, on the Menominee, operated by it, though only a 50 per cent. interest is owned by the Republic.

Its Mesaba work is at present confined to small operations, one of which is cleaning up the small Alexander deposit, which it will have entirely taken out in the course of the next few weeks, there being an estimate of about 30,000 tons left in the pit. In doing this it will clean up the Forest pit, containing a few thousand tons. Its big Kinney is idle, and if conditions do not improve materially will do nothing there during the season. It is now operating the Pettit, Mariska and Bessemer, and these on day shifts alone with a small tonnage. On the Marquette range its Cambria and Lillie are both operating, day shift alone, one of them having recently cut down from double shift to one. Its Antoine Ore Company operations were stopped some time ago, and the pumps are being pulled and the properties will now be permitted to fill with water. There is no likelihood of these latter mines resuming this year, even in a small way. Their ore is a low grade siliceous Bessemer, running about 40 to 45 per cent. iron and is of a flaggy nature, requiring crushing, a large Gates plant being used for this purpose. But in common with other concerns, the Republic is not mining any low grades this year.

The total shipments of the Republic Company, while not yet determined, are not likely to be more than 40 to 50 per cent. of those of 1907. Its Alexander mine is a very small Mesaba deposit, containing, all told, about 225,000 tons, of which 195,000 have been shipped. This mine and the Forest are one deposit, and were stripped as one, the entrance to the Alexander being through the Forest end of the pit. Their ore is of high grade, and is most desirable from every standpoint. They are typical of many little bodies of ore found in recent years along the Mesaba, subsequent to the time when explorers were looking for great tonnages merely, and when it had come to be realized that a small tonnage of good ore easily mined was not to be scorned. The total tonnage of the entire deposit, on both properties, was originally not more than 450,000 tons, a mere trifle when compared with the big mines that ship several times as much any season, but the course of recent events on the Mesaba has brought out the importance and value of these little mines, and a surprising number of them is now under development. They are so small that one to three years cleans them out, and they pass from the list. The nature of the Mesaba formation is such that these have not the possibility for future ore at depth which small producers on old ranges always show, and there is no hope that, once scrammed out to the bottoming quartzites, they may be reopened at greater depths and new deposits found. It is so much easier to reach the bottom of a Mesaba mine than to find the bottom of an old range property that the element of chance for the future is quite accurately eliminated. In the course of a very few years, after the iron trade has recovered its pace, there will be many of these worked out mines, which will doubtless be referred to by alarmists, by the way, as proof of the brevity of the existence of the district.

The Newport Mining Company.

The Newport Mining Company, Gogebic range, has completed and placed in commission its big D shaft, on which work has been in progress for some years. It is one of the largest shafts in the district, being five-compartment, 28 x 8.5 ft. inside its steel lining. Four of the compartments are used for hoisting ways, the fifth being for ladder way and pump columns. It is steel lined throughout, except from surface to ledge, where the lining is concrete, and is surmounted by a great steel shaft house of the most approved design. It is sunk in the foot wall some distance back from the ore formation, and is 2000 ft. deep, driven on a 62-degree incline, making it parallel to the lode. Some years ago extensive finds of ore at and beneath the 2000-ft. level in the east end of this mine were discovered and developed, and it was decided to sink a deep, permanent shaft to open them.

These finds were almost the first of the new deep discoveries of the Gogebic, which have reversed the situation in that district by their assurance of continued life at greater depths than former operators considered possible. As the direct result of this discovery at the Newport nearly a dozen great steel and concrete shafts of from 2000 to 3000 ft. in depth are being sunk or are planned at points along the Gogebic, and the range is seen to be not in its decadence, but in its young life. At the east end of the Newport, then known as the Bonnie portion of the mine, a small chimney of ore was followed from surface down to the fourteenth level in the hope that at some point it might flatten out on a cross dyke and spread into a considerable tonnage. It was so small that only about 35,000 to 40,000 tons of ore could be taken from each 100 ft. of depth attained. When the fourteenth level had been passed the hoped for spreading out on a dyke was found, and the dyke itself was cut on the fifteenth level, where the ore bottomed, and where, according to most former explorations, it might be considered to cease. But the ore has been followed along the dyke for more than 2000 ft., of the usual width and character of Gogebic ores, and the company is now mining on several levels, and has sunk considerably deeper. The Newport, by reason of this development, has become one of the very important mines of the range. Shaft sinking was commenced in the fall of 1905 and it was not expected that much ore could be hoisted through it before 1909. Old A shaft will soon be abandoned and the mine handled through the new D.

Some Other Operations.

Ground was broken a few days ago for a concrete shaft on another property in the new Gwinn District of the Marquette for the Cleveland-Cliffs Iron Company. This is to be known as the Northwestern mine, and lies east of the Smith mine, for which a concrete shaft was recently completed by the Foundation Company. This shaft is now being sunk to water level, about 15 ft. from surface, and there will be some 140 ft. of concrete lining beneath, making the work a very costly one. The mine is not of great tonnage, but its ore is good. The mine will be operated underground from a central power plant. At the new village the company is making rapid progress in its development of a model townsite.

Ore loading shovels have been placed in operation at several of the chief open pit mines of the Oliver Iron Mining Company, and the movement from outside companies is slowly improving. The Oliver mines to start are the Hull-Rust and Burt, at Hibbing, and six shovels are loading there, days only. In the meantime shovels loading at some other mines of the district have ceased for the time being. But the tonnage moving is improving a little. The pessimism in ore loading circles, which is evidenced by the continued curtailment of estimates for season shipments, is liable to lead the estimators too far, as indeed it may already have done. But it looks as though the shipowners operating vessels independently of mine ownership will do well to have 50 per cent. of their capacity taken.

Ore dock difficulties at Escanaba have been compromised, and the Top Dock Workers' Union is recognized, the railroad officers not having held out. But they do retain the privilege of picking those union men whom they will permit to work, in return giving up their former contention of nonrecognition or open shop.

As an instance of the way in which mining communities on Lake Superior rely on the mining companies for the money with which to run the public is the case of Iron Mountain, on the Menominee range, whose total tax assessment is $5,193,000, and of which total the Oliver and two smaller mining companies are assessed for $3,561,000.

D. E. W.

The Pittsburgh Foundrymen's Association.

On the evening of June 1, the regular monthly meeting of the Pittsburgh Foundrymen's Association took place at the Hotel Henry. An enjoyable dinner preceded the meeting.

The business session was called to order by President H. E. Field. Four new members were added. A communication was read from the Philadelphia Foundrymen's Association, asking whether its delegation to the convention of the American Foundrymen's Association at Toronto might arrange to accompany the Pittsburgh delegation in a special car, which will receive the secretary's attention.

President Field and Treasurer Seaman stated that some remittances had been received covering contributions to the fund being raised by the American Foundrymen's Association for research work, a worthy cause, but that many members had not been heard from. In view of what the Pittsburgh Association had done along this line in the past, they asked that a special effort be made to have these contributions sent in immediately, as the time was getting short.

Secretary F. H. Zimmers presented data covering the itinerary of the trip to the Toronto convention by the Pittsburgh delegation, and asked that each member who intended to avail himself of this trip send in his name promptly, so that the necessary arrangements could be made for their accommodation. From present indications Pittsburgh will be well represented.

President Field then introduced the speaker of the evening, Charles E. Pope, of the Coal & Coke By-Products Company, Pittsburgh, who made an interesting address on "By-Product Coke." The customary discussion did not follow, as this was the last meeting till September, and a special effort had been made to have all the past presidents of the association present. The time was taken up by remarks by such past presidents as were able to attend. Among those heard from were Messrs. Yagle, McLaren, Spilker (who also spoke for Mr. Thomas in his absence), Seaman, McFadden, Fuller and Field. The latter stated he was glad to feel he had helped the association in any way, and said that when he took up the presidency the membership was 83; five members were lost by moving away or resigning, but with the 28 new members gained so far this year, the present membership numbered 106. The amount of money in the hands of the treasurer is also satisfactory.

On motion of Secretary F. H. Zimmers, the old Programme Committee was renominated. The committee consists of Edward Frohman, W. B. Robinson, and H. E. Field. A vote of thanks was also passed to Mr. Pope, for his instructive address.

A. M. Spencer, technical engineer of the Harbison-Walker Refractories Company, Pittsburgh, who was scheduled to talk on "Cupola Brick," was unable to attend on account of business matters. He will likely present his address at a later meeting. The July and August meetings of the association will be dispensed with.

All the boats that were ordered for early delivery in 1908 at the Great Lake shipyards have been launched, with one exception. The total number built, including one to be launched this month, is 26. All the new vessels are freight boats except one. They range in capacity from 2200 to 10,000 tons. Eighteen boats have been built by the American Shipbuilding Company, six by the Great Lakes Engineering Works and one by the Toledo Shipbuilding Company.

The report for 1907 of J. Obalski, Superintendent of Mines for the Province of Quebec, notes that in that year the charcoal blast furnaces of the Canada Iron Furnace Company, Ltd., at Radnor, and of John McDougall & Co., at Drummondville, produced 10,047 net tons of pig iron, using mostly bog ore. The totals of raw materials charged were as follows, the ore and limestone being given in net tons: Ore, 22,681 tons; limestone, 4300 tons; charcoal, 1,151,149 bushels, counting 20 lb. to the bushel.

The Foundrymen's Convention at Toronto.

The secretary, Dr. Richard Moldenke, announces the following tentative list of papers and topics for discussion at the Toronto convention of the American Foundrymen's Association June 8-12:

"Prevention of Accidents in the Foundry," by Thomas D. West, Sharpsville, Pa.

"Annealing Castings," by W. M. Carr, New York City.

"Foundry Warehouse Methods," by F. C. Everitt, Trenton, N. J.

"Pattern Making for the Specialty Shop," by H. M. Lane, Cleveland, Ohio.

"Core Sands and Mixtures," by A. M. Loudon, Elmira, N. Y.

"Shop Management," by H. F. J. Porter, New York City.

"Foundry Waste," by Harrington Emerson, New York City.

"Ferroalloys in the Foundry," by W. M. Saunders, Providence, R. I.

"Cupola Thermics," by S. H. Stupakoff, Pittsburgh, Pa.

"Specifications for Castings to Be Machined," by H. E. Diller, Chicago, Ill.

"Foundry Transportation Methods," by David Goehr, Cleveland, Ohio.

"Coke Making in the United States," by Dr. R. Moldenke, Watchung, N. J. (Illustrated.)

"Further Notes on Sandless Castings," by V. B. Lamb, New Haven, Conn.

"Titanium in Cast Iron," by Dr. R. Moldenke, Watchung, N. J.

"Machine Molding," by E. H. Mumford, Philadelphia, Pa. Discussion.

"The Production of Automobile Cylinders," by L. N. Perrault, Waterbury, Conn.

"Automobile Cylinder Making," by F. W. Stickle, Hartford, Conn.

"Chemical Reactions in Foundry Cupola Practice," by Jules de Clercy, Montreal, P. Q.

"Notes on Cupola Practice," by Prof. H. McCormack, Chicago, Ill.

Report of Cost Committee, with special discussion by Harrington Emerson and E. M. Taylor, and a special paper on "Cost Accounts," with the committee report by Kenneth Falconer, chairman.

Industrial education: Report of P. Kreuzpointner, chairman. General discussion, with some special papers and descriptions of schools.

Papers are also expected on the "Development of Thermit in the Foundry," on "Valve Making" and on "Oxy-Acetylene Welding of Castings."

Discussions are scheduled on the following subjects: "Turnings and Borings in the Cupola," "Clamping Molds," "Radiator Cores," "Sea Coal Facings," "Castings for Mine Water," "The Ethics of Selling Castings" and "The Proposed Change in Foundry Pig Iron Specifications."

The Indiana Manufacturers' and Shippers' Association, with headquarters at Indianapolis, will send representatives to South Bend, Ind., June 10, to become acquainted with the varied business, manufacturing and shipping interests of that city. This organization is to have its representatives visit other cities of the State, with similar purpose. The party will spend three days at South Bend, during which time the members will be the guests of the South Bend Merchants' Association. The delegation will consist of J. E. Frederick, Kokomo, president of the association; J. V. Zartman, Indianapolis, secretary; C. H. Jones, Indianapolis, assistant secretary; James E. McCullough, attorney, Indianapolis; C. M. Kimbrough, manufacturer, Muncie; and Union B. Hunt and William J. Wood, members of the Indiana Railroad Commission.

The James McNeil & Brother Company, Pittsburgh, builders of heavy plate work, has received a contract from the Municipal Light & Power Company, Seattle, Wash., for 2200 ft. of 48-in. riveted steel pipe for water service. This pipe averages 310 lb. per foot in weight, and ranges from ⅜ to 9-16 in. thickness of shell. The plates will be rolled by the Carnegie Steel Company.

We are officially advised by the Youngstown Sheet & Tube Company, Youngstown, Ohio, that the report that it would build a tin plate mill this year is incorrect. The company has considered the matter of building such a plant, but nothing will be done with the project this year.

Pig Iron Output in May.

Merchant Furnaces Show a Falling Off.

Total Active Capacity Less Than on May 1.

Returns from the producers of pig iron show that the output of coke and anthracite iron in the 31 days of May was 1,163,997 gross tons, as compared with 1,149,602 tons in the 30 days of April. This shows a falling off in the daily rate from 38,289 tons in April to 37,548 tons. The steel works furnaces increased their total production over that of April as well as their daily rate. The weekly capacity of both steel works and merchant furnaces active on June 1 was 260,584 tons, as compared with 268,674 tons on May 1.

The daily output of the steel works and merchant furnaces respectively in the first five months of the year was as follows:

Daily Rate of Production.—Gross Tons.

	Steel works.	Merchant.	Total.
January	21,432	12,286	33,718
February	25,717	11,446	37,163
March	27,145	12,474	39,619
April	24,185	14,104	38,289
May	24,509	13,039	37,548

The table below gives the production of coke and anthracite furnaces in May and the four months preceding:

Monthly Pig Iron Production.—Gross Tons.

	Jan. (31 days)	Feb. (29 days)	March. (31 days)	April. (30 days)	May. (31 days)
New York	82,962	65,567	49,231	62,263	64,746
New Jersey	22,447	19,880	23,243	22,701	20,889
Lehigh Valley	47,538	39,732	39,105	28,919	28,712
Schuylkill Val.	24,002	22,338	29,104	28,654	25,566
Lower Susquehanna and Lebanon Val.	20,323	19,363	23,907	28,315	29,943
Pittsburgh Dis.	304,521	324,418	325,953	276,883	285,833
Shenango Val.	69,149	68,919	76,377	71,970	53,720
West. Penn.	60,355	51,283	62,782	54,570	54,202
Md., Va., and Kentucky	30,621	27,775	41,452	48,955	48,773
Wheeling Dis.	0	12,961	18,988	17,930	18,121
Mahoning Val.	64,437	93,332	105,310	94,780	99,788
Central and North. Ohio	52,297	75,137	94,952	88,047	87,862
Hocking Valley and Hanging Rock	8,404	12,296	20,108	18,772	20,409
Mich.,Minn.,Mo., Wis., Colo.	38,172	36,129	39,327	36,808	36,831
Chicago Dis.	120,874	99,289	147,014	157,633	165,291
Alabama	81,541	91,209	114,295	94,754	104,210
Tennessee, Georgia and Texas	17,607	18,112	17,056	17,648	19,101
Totals	1,045,250	1,077,740	1,228,204	1,149,602	1,163,997

Production of Steel Companies.

Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Republic, Youngstown Sheet & Tube Company, Jones & Laughlin, La Belle, Bethlehem, Calumet, Inland, Colorado and Tennessee (Ensley) companies show the following totals of product month by month. We give separately a statement of the output of spiegeleisen and ferromanganese, which is included for each month in the total production:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1906.	1907.	1908.	1907.	1908.
January	1,358,015	1,406,397	664,415	21,477	20,254
February	1,226,760	1,317,923	745,802	19,444	9,402
March	1,400,395	1,424,827	841,502	31,091	13,750
April	1,333,591	1,446,788	725,548	26,527	12,363
May	1,372,423	1,470,080	759,674	28,822	17,823
June	1,293,437	1,457,230	.....	30,942	.....
July	1,323,391	1,452,557	.....	25,343	.....
August	1,237,485	1,445,685	.....	23,696	.....
September	1,264,380	1,417,153	.....	30,270	.....
October	1,452,200	1,514,521	.....	35,105	.....
November	1,411,350	1,084,114	.....	21,861	.....
December	1,445,528	659,459	.....	19,480	.....

Capacity in Blast June 1 and May 1.

The table below gives the weekly capacity of coke and anthracite furnaces in blast June 1 and May 1:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	June 1. Number in blast.	June 1. Capacity per week.	May 1. Number in blast.	May 1. Capacity per week.
New York:					
Buffalo	14	7	13,372	7	13,291
Other New York	10	1	1,253	1	1,237
New Jersey	8	4	4,956	4	5,297
Spiegel	2	0	0	0	0
Pennsylvania:					
Lehigh Valley	25	5	5,965	8	6,612
Spiegel	3	1	128	1	136
Schuylkill Valley	15	4	5,768	4	5,487
Lower Susquehanna.	7	2	3,350	2	3,610
Spiegel	1	0	0	0	0
Lebanon Valley	10	4	3,423	4	3,199
Pittsburgh District.	45	19	57,610	23	69,150
Spiegel	3	2	1,957	1	766
Shenango Valley	20	6	13,937	5	12,584
West. Pennsylvania.	27	10	14,650	8	12,435
Maryland	4	2	4,214	2	4,126
Wheeling District	14	2	4,088	2	4,184
Ohio:					
Mahoning Valley	18	10	25,648	9	21,026
Central and North. and Michigan	22	7	18,669	8	21,669
Hocking Valley and Hanging Rock	12	6	4,206	6	4,464
Illinois and Indiana.	23	14	38,012	13	36,781
Spiegel	2	1	1,125	1	1,379
Minnesota	1	0	0	0	0
Wisconsin	6	1	962	1	1,400
Missouri	1	0	0	0	0
Colorado	6	2	4,326	3	5,817
The South:					
Virginia	23	8	5,677	9	6,470
Kentucky	7	1	1,148	1	972
Alabama	46	16	22,430	16	22,444
Tennessee	18	6	3,710	7	4,138
Georgia and Texas.	3	0	0	0	0
Total	396	141	260,584	146	268,674

A Record of Active Capacity.

The active weekly capacity in coke and anthracite iron has shown the following fluctuations since January 1, 1903:

	Capacity per week.		Capacity per week.
June 1	260,584	September 1	412,563
May 1	268,674	August 1	410,088
April 1	264,890	July 1	408,617
March 1	267,437	June 1	443,092
February 1	241,925	May 1	452,031
January 1, 1908	232,652	April 1	439,564
December 1, 1907	347,372	March 1	403,157
November 1	491,436	February 1	405,792
October 1	511,397	January 1, 1905	377,879
September 1	507,768	December 1, 1904	357,846
August 1	513,471	November 1	334,249
July 1	528,170	October 1	319,249
June 1	523,220	September 1	291,573
May 1	524,538	August 1	246,092
April 1	496,456	July 1	272,301
March 1	511,035	June 1	336,107
February 1	492,359	May 1	368,244
January 1, 1907	507,397	April 1	337,257
December 1, 1906	513,860	March 1	308,751
November 1	500,580	February 1	273,692
October 1	469,665	January 1, 1904	185,636
September 1	441,426	December 1, 1903	244,156
August 1	449,908	November 1	273,715
July 1	460,570	October 1	353,142
June 1	472,622	September 1	360,197
May 1	484,031	August 1	353,681
April 1	484,240	July 1	384,825
March 1	479,737	June 1	388,178
February 1	482,156	May 1	373,496
January 1, 1906	463,673	April 1	386,215
December 1, 1905	475,814	March 1	347,424
November 1	460,449	February 1	335,239
October 1	445,468	January 1, 1903	346,073

Furnaces In and Out.

Among furnaces blown in in May were Buffalo C in New York, one Carrie and one Edgar Thomson in the Pittsburgh District, one Shenango in the Shenango Valley, Colonial and Perry in western Pennsylvania, one Calumet in Illinois, Cherry Valley and one Ohio in the Mahoning Valley, two Sloss in Alabama.

The list of furnaces blown out last month includes one Colorado, one Niagara at Tonawanda, Musconetcong in New Jersey, one Bethlehem and two Thomas Iron Company in the Lehigh Valley, one Duquesne, two Shoenberger and Midland in the Pittsburgh District, Alleghany in Virginia, one Central at Cleveland, Mattie in the Mahoning Valley, and Woodstock in Alabama, besides one Sheffield furnace of the Sloss-Sheffield Steel & Iron Company.

NEWS OF THE WORKS.

Iron and Steel.

The Warwick Iron & Steel Company, Pottstown, Pa., blew out its No. 3 furnace in April following the blowing in of its No. 1 furnace. The shell of No. 3 furnace, which was built about 1866 or 1868, was in such a condition that it was found necessary to take it down. The company now intends to rebuild the stack and reline it in order to have it ready for operation as soon as an improvement in business shall warrant its operation. No other changes or additions will be made to the furnace other than to replace the worn-out shell.

The Sweet's Steel Company, Williamsport, Pa., has not yet decided upon plans for rebuilding the part of its plant which was recently destroyed by fire, and has not yet ascertained just what machinery will have to be replaced.

Victoria Furnace of the Goshen Iron Company, Goshen, Va., was banked from May 13 to May 25.

Hamilton Furnace of the Hanging Rock Iron Company, Hanging Rock, Ohio, was blown in May 22.

The Northwestern Iron Company expects to blow in its Furnace B this week.

Owing to a break out June 1 the furnace of the Struthers Furnace Company, Struthers, Ohio, will be idle about two weeks.

One of the Ohio furnaces of the Carnegie Steel Company, Youngstown, Ohio, was blown in May 27, and all four stacks are now active.

The furnace of the Woodstock Iron & Steel Corporation, Anniston, Ala., was blown out May 31.

The furnace of the Embree Iron Company, Embreeville, Tenn., was blown out May 23 for relining.

The blast furnace of the Midland Steel Company at Midland, Pa., was blown out June 1.

Furnace A of the Wisconsin Steel Company, South Chicago, Ill., was blown in May 23. The No. 2 stack of this company is expected to be blown in about July 1, when it will have three furnaces in blast.

One furnace of the Colorado Fuel & Iron Company, Pueblo, Colo., was blown out May 31.

Furnace C of the Buffalo Union Furnace Company, Buffalo, N. Y., was blown in May 30.

Furnace A of the Tonawanda Iron & Steel Company, Tonawanda, N. Y., was blown out May 23.

The furnace of the Musconetcong Iron Works, Stanhope, N. J., was blown out May 25.

Furnace D of the Bethlehem Steel Company, South Bethlehem, Pa., was blown out May 10.

The No. 4 furnace of the Shenango Furnace Company, Sharpsville, Pa., was blown in May 27.

One stack of the Colonial Iron Company, Riddlesburg, Pa., was blown in June 1.

The Commonwealth Securities Company, San Diego, Cal., has been incorporated with a capital stock of $1,000,000 to establish steel works in the vicinity of that city. Charles R. Hill is president and treasurer, Frederick W. Stearns, vice-president and general counsel, and V. A. Vehnel, secretary.

It is announced that Nos. 1 and 4 blast furnaces of the Tennessee Coal, Iron & Railroad Company at Ensley, Ala., will be put in operation. It is also announced that Alice Furnace, at Birmingham, belonging to the same company, will be put in blast. A second furnace at Bessemer starts up this week.

No. 2 furnace of the Woodward Iron Company is being relined and will make basic iron when put in operation.

General Machinery.

New plant improvements being made by the Continental Motor Mfg. Company, Muskegon, Mich., builder of automobile and marine equipment, include the erection of a one-story fireproof machine shop, 110 x 160 ft., of concrete and steel, with saw tooth roof; also a new pattern shop and timekeeper's office. Work on these extensions are already in progress, and the company expects to occupy the new buildings about the middle of August.

The American Sheet & Tin Plate Company is having a new office built at the machine shop at Scottdale, Pa., and as soon as this office is completed the company will remodel the entire shop and about double its present capacity.

E. E. Morris has been appointed receiver for the American Machine Works, Seattle, Wash. The assets of the company are stated to be about $15,000 and the liabilities about $5000.

The Lake Superior Corporation, Sault Ste. Marie, Ont., has not completed plans for rebuilding its paper mill, which was recently destroyed by fire, and has not yet ascertained what machinery it will have to purchase to replace that destroyed.

The American Machinery Company has been organized at Port Huron, Mich., to manufacture machinery, and has taken over the plant of the Meisel Mfg. Company.

Power Plant Equipment.

The Public Service Company, St. Cloud, Minn., will build a water power station to develop about 1600 hp. This will include the construction of a power house, 28 x 97 ft., which will be of brick and reinforced concrete.

The city secretary of Houston, Texas, will receive bids until July 27 for the erection of a 15,000,000 gal. pumping engine at the water plant, bidders to furnish plans and specifications, which must provide for complete installation of the engine.

The Newport Water, Light & Power Company, Newport, Ark., incorporated with a capital stock of $100,000, has purchased the property of the Newport Water Company, and having secured from the city a 30-year franchise will either purchase the electric light plant now operating there or erect a new one. The company is about ready to purchase 4, 6 and 8 in. cast iron pipe for water main extensions, of which about two miles will be laid. Other improvements are also in contemplation. The officers are A. N. Walker, president, Marion, S. C.; N. V. H. Walker, vice-president and general manager, Aurora, Mo.; Col. L. Minor, treasurer and secretary, Newport, Ark.

The Parker Boiler Company, Philadelphia, Pa., has in course of erection a 499-hp. boiler for the Astoria Veneer Mills, Long Island City, N. Y.; two 236 and one 223-hp. boilers, Lawyers' Title Insurance & Trust Company, New York, and two 260-hp. boilers, Raymond Lead Company, Chicago, Ill.

The Mitchell Power Company, Mitchell, S. D., having purchased the electric light and gas plant of the Mitchell Gas Company, is preparing to enlarge and improve it; the construction of a new coal gas plant is also in contemplation.

Bonds in the sum of $10,000 have been issued by the town of Weston, Neb., to provide funds for the erection of a water works plant. No plans or specifications have been prepared.

Plans for changes and improvements to be made in the electric light and water plant at Buhl, Minn., are being prepared by Oscar Claussen, engineer, St. Paul, Minn., and as soon as completed bids will be received for material and work of construction.

The recent fire at the plant of the Port Arthur Electric Light & Power Company, Port Arthur, Ont., destroyed seven dynamos and 16 transformers, lathe, tools and a quantity of supplies, leaving intact only the walls of the building, two steel penstocks and two water wheels, with the shafting. The damage amounted to about $35,000. New dynamos, gear wheels with new shafting, bearings and pinions were placed in position, a new roof was put on the building and the plant was placed in operation and light and power furnished to the town 17 days after the fire.

Foundries.

The Auburn Foundry Company, Auburn, Ind., incorporated with a capital stock of $15,000, has a new foundry in course of construction, which it is expected will be ready for occupancy about July 1. Light and medium gray iron castings will be made and special attention will be given to the production of automobile castings of all descriptions, of which the local automobile factories are large users. All of the buildings in this plant, including the office building, will be constructed of concrete blocks. F. W. Payne is secretary and treasurer.

The Gadsden Pipe & Fitting Company, Gadsden, Ala., has resumed operations after an idleness of a number of months.

Bridges and Buildings.

The Interstate Engineering Company, Bedford, Ohio, has been given the contract for the steel superstructure for the new factory being erected by the Enameled Pipe & Mfg. Company in Elyria, Ohio.

Fires.

The main building of the Imperial Stove Works, Morrisburg, Ont., was destroyed by fire May 26, the loss being about $25,000.

The plant of the Krell Piano Company, Cincinnati, Ohio, was burned May 26, the loss being about $25,000.

The pulp mill of the Wolf River Fibre & Paper Company, Shawanee, Wis., was burned last week. The loss is placed at $50,000.

John Abrams & Sons' machine shop at Moncton, N. B., was recently destroyed by fire.

Hardware.

The Kaneville Supply Company, manufacturer of pumps and pump supplies, is removing its plant to Kaneville, Ill., from Chicago, where under another name it manufactured the Star Pointer pumps. The company will occupy a new factory building provided for it by the town of Kaneville.

Miscellaneous.

The Columbia Mine, Sumpter, Ore., has substituted electricity as a motive power instead of steam, and is successfully operating its machinery under 2300 volts of generative current.

By the organization of the Tomah Electric Light & Power Company, Tomah, Wis., incorporated with a capital of $30,000, the C. A. Goodyear Lumber Company has divided its lumber mill and lighting business into two distinct units. The business of the new company will be conducted in the same manner as

heretofore, the stock being owned entirely by the C. A. Goodyear Lumber Company.

D. Miller & Sons, Green Bay, Wis., wholesale dealers in junk, metals and scrap iron, have improved their facilities for handling material by the installation of an electrically operated shear and derrick. A cement floor, 53 x 100 ft., is being laid in the stock yard, which, together with new loading platforms, will make it one of the most conveniently arranged plants of its kind in that vicinity.

Benjamin Lawter of Newcastle, Ind., has invented and patented a new engine for automobiles, and the Safety Shredder Company of that city is preparing to manufacture automobiles equipped with this engine.

The recent fire at the plant of the Republic Belting Company, Cleveland, Ohio, did but little damage and will only inconvenience the company for a few days. The loss is fully covered by insurance, which is expected to be promptly adjusted.

The Staples Valve Company, Newburgh, N. Y., has increased its capital stock from $150,000 to $300,000.

The Howard Stove & Mfg. Company, Savannah, Mo., has under consideration the removal of its plant to Omaha, Neb., arrangements for which have not yet definitely been decided upon. If the company should decide to move the entire plant will be electrically driven.

The B. A. Berger Mfg. Company, Richmond, Va., has been incorporated with a capital stock of $50,000, to manufacture a patented bracket and other steel specialties used by plumbers. The bracket was formerly manufactured by B. A. Berger, and the capacity of the present plant will be enlarged by installing additional machinery. B. A. Berger is president; H. N. Francis, vice-president, and James Estes, secretary and treasurer. The company is not in the market for new machinery.

The Howle Roofing Company, Detroit, Mich., was the successful contractor for the sheet metal work on the new chapel building now being erected for the Eastern Michigan Asylum at Pontiac, Mich. Wherever tin is required Scott's extra coated, made by the Follansbee Brothers Company, Pittsburgh, with open hearth steel plant, sheet and tin mills at Follansbee, W. Va., will be used.

The National Radiator Company, Johnstown, Pa., has completed patterns and is now manufacturing a full line of plain radiators.

The Lorain Iron & Metal Company, Lorain, Ohio, has been incorporated with a capital stock of $10,000, by Sam Hample, A. Gordon, G. A. Resek, L. R. Rawson and C. F. Adams. The company will deal in scrap. A yard will be established for handling the material.

OBITUARY.

WILBUR FISK LUNT, for the past 17 years a member of the Board of United States General Appraisers, died at his residence in New York City May 28, aged 60 years. He was appointed by President Harrison in 1891, and during his tenure of office traveled through all sections of the country hearing customs protests. He became widely known, and was the author of many important decisions of the customs tribunal. He was born at Biddeford, Maine, and was United States District Attorney for the District of Maine when he was named for the General Appraisership. He served in the Union Army, and a wound received at the battle of Antietam was the direct cause of death.

ROBERT F. MANN, Cincinnati, died May 26. He was a native of Bathurst, New Brunswick, and was a well known machinist, having attained prominence in the trade. He had been connected with Schumacher & Boyé, manufacturers of machine tools, Cincinnati, for about eight years, being assistant superintendent at the time of his death.

GEORGE E. HAIGHT, president of the Henry G. Thompson & Son Company, New Haven, Conn., died May 27, after a long illness, aged 62 years. He was a man of inventive genius.

FRED. A. JOHNSON, president of the Gisholt Machine Company, Madison, Wis., died in Denver, Colo., May 26. He had been connected with the company since its incorporation, in 1887, and became its president in 1901. He took an active part in the management of the business, and spent several years in Europe in the interests of the company. Since 1904, however, owing to ill health, he had been unable to attend to business.

James S. Watson, manager of the drive chain department of the Link-Belt Company, has transferred his headquarters from the Philadelphia Works to the company's chain manufacturing plant at Indianapolis. In his new field he will combine supervision of manufacture with direction of the selling force handling the Renold silent and roller chains.

PERSONAL.

William R. Webster, Philadelphia, attended the recent meeting of the Iron and Steel Institute in London.

H. B. Thwing, of the Whitcomb-Blaisdell Company, Worcester, Mass., sailed from New York May 28 for Europe, to be absent about six weeks.

Israel H. Johnson, Jr., of Israel H. Johnson, Jr., & Co., Philadelphia, Pa., left for Europe May 28 to be gone several weeks.

S. Madison, manager of the Ryder-Ericsson Engine Company, Sydney, Australia, which was formed several months ago to take care of the Australian business of the Ryder-Ericsson Company, is in New York on a business trip for a two weeks' stay.

James R. Anderson, of the Lunkenheimer Company, Cincinnati, Ohio, sailed May 30, for Jamaica. From this point Mr. Anderson will go to Panama and then work his way down the west coast of South America, stopping at all the important Eastern ports on his return. He expects to return to New York some time next November.

Edward S. Illig, Pacific Coast sales manager for the Bethlehem Steel Company, has returned to San Francisco after a month's visit on the Atlantic Coast.

J. A. McGregor, president of the Union Iron Works, San Francisco, recently visited New York on a short business trip.

Arthur Lucian Walker, for many years identified with copper and lead smelting enterprises, has accepted the post of professor of metallurgy and administration branch of the department of metallurgy at Columbia University. Mr. Walker is a graduate of the School of Mines. Professor Howe will continue to deliver his lectures on iron and steel as heretofore.

Ill health has forced J. S. Jeans, who has been secretary for upward of 30 years of the British Iron Trade Association, to retire. He has been succeeded by C. J. F. Scott, who was selected out of some 400 candidates.

Joseph Butler, Jr., of Youngstown, Ohio, expects soon to sail on the Amerika for an absence of about two months.

William B. Simpson, for several years treasurer and sales manager of A. M. Castle & Co., Chicago, has been elected president of the company, to succeed A. M. Castle, deceased. Owing to Mr. Castle's declining health, Mr. Simpson has been in practical charge of the company's affairs for the past three years, and the business will therefore continue without change.

Humphrey D. Bond of Vivian Bond & Co., New York, sailed May 30 for a short European business trip.

E. F. Jones has been made general manager of the Morgan Spring Company, Worcester, Mass., succeeding Frank F. Bullard, resigned. Mr. Jones has been manager of the Southern Steel Company for the past year, with headquarters at Birmingham, Ala., and for the prior 12 years was connected with the Deering Harvester Company and its successor, the International Harvester Company.

The Mexican Minister of Finance has drafted a measure, which it is expected will pass the Mexican Congress, providing for subsidies for irrigation companies. The amount to be expended is limited to $25,000,000, but if the movement is a success it is likely to be increased. The bill also confers upon the Federal Government the right to grant for 10 years free importation of agricultural implements, cattle for breeding purposes, materials, seed and other things that may be determined upon. The Government may also exempt for 10 years the products of irrigated lands from export duties. It is said that many agricultural products can be raised near the Rio Grande border and exported to the United States at a profit under these provisions.

The Iron and Metal Trades

The full significance of the concerted reduction in the price of Steel Bars and Small Shapes cannot yet be measured. It will probably lead to readjustments of such collateral lines as Bands and Merchant Steel. Many in the trade regard it as the forerunner of lower prices along the whole line of finished products, and are encouraged in this conviction by the fact that only a few weeks ago the selling forces of large interests freely advised their customers that lower prices were coming, and then had to recall the intimation after the last general Steel meeting. The fact that the large steel interests are still in conference in this city is worthy of mention in this connection.

In some respects the conditions surrounding the Steel Bar trade are not typical of the others. The steel interests have far less influence in it than they have in Billets, Shapes or Plates. The rerolling mills have been very active recently and have been making low prices. The Bar Iron makers have been cutting and on the seaboard went down to 1.35 cents delivered, which is far below the Pittsburgh base. Advices from the West show that the Bar Iron makers there have responded to the decline in Steel Bars by reducing their price.

The developments in the Steel Bar trade have been precipitated by the fear among the larger interests that too large a share of the pending season business of the agricultural implement makers might go to those who have not co-operated in the price maintenance policy. These important season contracts are usually made for the requirements for a year beginning on July 1 and cover a large tonnage.

Another factor which has come up for discussion among the leading interests is the differential of $2 per ton on Bars, which is given by some to a few of the largest jobbing houses in the country.

There has been some uneasiness for some time past in the Structural trade, due to the fact that fabricators have been taking business at prices so low that they seem to be backed by special figures on the plain Structural material.

After the rush of buying in the Pig Iron trade throughout the country, the markets have quieted down. This appears to be most pronounced where sellers have marked up their prices. This has been done chiefly by Southern makers, who now ask generally $12 for No. 2 Foundry, Birmingham, for second half delivery, while some June iron is still available at $11.50.

To a lesser degree, makers in the Central West and in the East have put up their prices. There is still some business pending, notably in Malleable Iron, but the rush is over.

The blast furnace statistics collected by *The Iron Age* show that the Pig Iron output in May was 1,164,000 tons, compared with 1,150,000 tons in April, the merchant furnace product declining from 14,104 tons daily in April to 13,039 tons daily in May. Productive capacity, however, appears to be decreasing further, there having been active on May 1 146 furnaces with a weekly capacity of 268,674 tons, as against 141 furnaces and 260,584 tons capacity on June 1.

The 20,000-ton Syracuse water pipe contract went at a low figure, $23 per net ton.

LATER.—The Western Bar Iron mills have fixed the prices of Iron Bars at 1.40c., base, for Pittsburgh, northern and eastern Ohio, West Virginia and western New York, and at 1.35c., base, for points west of the Grand Rapids & Indiana Railroad, which includes the Chicago District. These prices are at Pittsburgh, plus freight to destination.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	June 3, 1908.	May 27, 1908.	May 6, 1908.	June 5, 1907.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	*$16.75*	$16.75	$17.50	$25.50
Foundry No. 2, Southern, Cincinnati	**15.25**	14.75	14.75	24.25
Foundry No 2, Local, Chicago	*17.25*	17.25	17.35	26.50
Bessemer, Pittsburgh	*16.90*	16.90	17.90	24.40
Gray Forge, Pittsburgh	14.90	14.90	14.90	23.15
Lake Superior Charcoal, Chicago	20.00	20.00	20.00	27.50
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	28.00	28.00	28.00	30.00
Forging Billets, Pittsburgh	30.00	30.00	30.00	35.00
Open Hearth Billets, Phila	29.20	29.20	29.20	32.50
Wire Rods, Pittsburgh	35.00	35.00	35.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago	**12.25**	12.00	12.00	18.50
Steel Rails, Melting, Phila	**13.00**	13.00	12.75	20.00
Iron Rails, Chicago	**15.50**	15.00	14.75	24.50
Iron Rails, Philadelphia	**18.00**	18.00	17.00	27.50
Car Wheels, Chicago	**13.00**	13.00	12.50	25.50
Car Wheels, Philadelphia	14.00	14.00	14.00	25.50
Heavy Steel Scrap, Pittsburgh	**13.00**	13.00	12.75	18.50
Heavy Steel Scrap, Chicago	**11.50**	11.00	10.50	16.00
Heavy Steel Scrap, Phila	**13.00**	13.00	12.75	19.00
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	*1.40*	1.45	1.46	1.83⅓
Common Iron Bars, Chicago	*1.58*	1.65	1.65	1.78
Common Iron Bars, Pittsburgh	1.50	1.50	1.50	1.75
Steel Bars, Tidewater, New York	1.76	1.76	1.76	1.84⅓
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater, New York	1.86	1.86	1.86	1.84⅓
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.70
Beams, Tidewater, New York	1.86	1.86	1.86	1.84⅓
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.86	1.86	1.86	1.84⅓
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.55	1.55	1.55	1.85
Skelp, Sheared Steel, Pittsburgh	1.65	1.65	1.65	1.90
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.40	2.40	2.40	2.50
Wire Nails, Pittsburgh	2.05	2.05	2.05	2.00
Cut Nails, Pittsburgh	*1.85*	1.85	1.90	2.05
Barb Wire, Galv., Pittsburgh	2.50	2.50	2.50	2.45
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	**13.00**	12.87½	12.87½	24.25
Electrolytic Copper, New York	12.62½	12.62½	12.62½	23.37½
Spelter, New York	*4.55*	4.55	4.65	6.50
Spelter, St. Louis	*4.40*	4.40	4.50	6.40
Lead, New York	**4.30**	4.35	4.20	5.75
Lead, St. Louis	**4.20**	4.20	4.10	5.65
Tin, New York	*28.85*	28.50	31.05	41.50
Antimony, Hallett, New York	8.50	8.50	8.50	17.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	$3.89	$3.89	$3.89	$4.09

Chicago.

FISHER BUILDING, June 3, 1908.—(*By Telegraph.*)

Foremost in the week's events in market interest is the reduction of $4 a ton on Steel Bars. In view of the recent meeting of leading manufacturers and the statement issued thereafter to the effect that prices would be maintained, coupled with a strong intimation that there would be no change until fall, the news of the cut occasioned no little surprise. What effect the reduction will have in stimulating buying can only be conjectured, as the trade has not had time to respond. The implement makers, whose annual contracts are made to cover from July to July, were already making inquiries as to prices on their requirements for the coming year, but no tonnage has been placed. If the new price of 1.40c., Pittsburgh, or 1.58c., Chicago, is accepted as the final word, a brisk business in Steel Bars may be expected to develop within the next week or two. Very few new orders for either Steel or Iron Bars have been entered in the past few weeks, and with outstanding contracts practically completed the incoming tonnage has been greatly reduced. The specification last week of 52,000 tons of Rails by the Illinois Central Railroad furnishes a welcome addition to tonnage available for rolling schedules in the Rail mills of the Tennessee Coal, Iron & Railroad Company and the Illinois Steel Company. The major part of this order, 42,000 tons, being Open Hearth Rails, will be rolled by the former, and the remaining 10,000 tons by the latter company. No new orders of any consequence are being placed by the railroads, nor is it expected that the present restriction upon purchases will be relaxed until after the close of

the present fiscal year, which terminates June 30. The belief is prevalent, however, that next month will mark the beginning of a liberal policy in this respect, resulting in substantial increase of orders from this most important consuming interest. As compared with the volume of business placed during the recent buying movement, last week's transactions in Pig Iron were rather light. The advance to $12, Birmingham, by all the leading Southern furnaces seems to have had the effect of discouraging extensive buying for anticipated requirements, but quite a number of orders from the smaller melters for moderate tonnage have been entered at this price. Producers are not at all eager to fill up furnace capacities for the last quarter at the prevailing price, and are offering no concession to that end, the future strength of which is not yet clearly enough outlined to furnish a confident forecast.

Pig Iron.—The recent active movement in Pig Iron has abated considerably, with the result that last week's sales were scattering and dropped off sharply both in the aggregate and individual tonnages. Three or four lots of 1000 tons were included in the purchases made, but the bulk of the business was composed of smaller lots. Practically all the Southern furnaces are now squarely on a $12, Birmingham, basis for second half deliveries, and while most of them will book through the entire period at this price, all are apparently unwilling to take on fourth quarter alone, except at an advance of not less than 50c. a ton. It is likely that Iron can still be had for June delivery at $11.50, Birmingham; at least some sales of this character have been included in the week's transactions. Considerably more inquiry for Malleable Bessemer has developed, and several lots ranging from a few hundred up to 1000 tons were taken; the demand is largely from implement makers and other interests outside of the railroad Malleable shops, which are not yet evincing any interest in the market. Northern Iron has firmed up, and some sellers are asking $17.50, furnace, for No. 2 Foundry and Malleable Bessemer. Whether consumers will continue to buy at the $12 price, for Southern, will doubtless depend on collateral conditions. Unless there is an early improvement in the demand for foundry products it seems probable that the market will soon lapse into its former quiet state. Transactions will be limited to current needs. The American Radiator Company is credited with the purchase of 10,000 tons, bought in odd lots from various sources within the past two weeks. The following prices are for June delivery, f.o.b. Chicago:

Lake Superior Charcoal	$20.00 to $20.50
Northern Coke Foundry, No. 1	17.75 to 18.25
Northern Coke Foundry, No. 2	17.25 to 17.75
Northern Coke Foundry, No. 3	16.75 to 17.25
Northern Scotch, No. 1	18.25 to 18.75
Southern Coke, No. 1	16.85 to 17.35
Southern Coke, No. 2	16.35 to 16.85
Southern Coke, No. 3	15.85 to 16.35
Southern Coke, No. 4	15.35 to 15.85
Southern Coke, No. 1 Soft	16.85 to 17.35
Southern Coke, No. 2 Soft	16.35 to 16.85
Southern Gray Forge	14.35 to 14.85
Southern Mottled	14.10 to 14.60
Malleable Bessemer	17.25 to 17.75
Standard Bessemer	18.40 to 18.90
Jackson Co. and Kentucky Silvery, 6 %	18.90 to 19.40
Jackson Co. and Kentucky Silvery, 8 %	20.90 to 21.40
Jackson Co. and Kentucky Silvery, 10 %	22.90 to 23.40

(*By Mail.*)

Billets and Rods.—A few straggling orders for Forging Billets, mostly for less than carload lots, represents the full measure of market activity. What little demand there is comes mainly from the smaller shops making light forgings. Under present conditions there is nothing to tempt a departure from established prices which, we are advised, are being absolutely maintained at the regular quotations of $31.50 to $32.50, Chicago. In sympathy with the declining demand for Wire products, Wire Rods are correspondingly quiet, and while a fair amount of specifications are coming in very little new business is being offered. Prices remain unchanged as follows: Bessemer, $35; Basic, $36; Chain, $37, all at Pittsburgh.

Rails and Track Supplies.—The receipt of specifications by the United States Steel Corporation from the Illinois Central Railroad for 52,000 tons of Rails was the central feature of last week's transactions. This tonnage will be distributed between the mills of the Tennessee Coal, Iron & Railroad Company and the Illinois Steel Company, 42,000 tons of Open Hearth being awarded to the former and 10,000 tons Bessemer to the latter. No new orders for steam Rails of noteworthy tonnage have been entered, but the local mill has specifications enough in hand to keep it in operation well into July, with prospects of an uninterrupted run through the greater part of the year. The tonnage of Light Rails booked by the principal interest for the month of May exceeded that of any previous month this year. Little new business in Spikes, Bolts and Track Supplies is being offered, but specifications against recent contracts are being liberally furnished. An order for 800 tons of High T Open Hearth Rails placed by the Detroit United Railways Company was secured by the Pennsylvania Steel Company. It is noted that there are more inquiries in the market from traction companies, but they generally represent moderate requirements. We quote as follows: Angle Bars, accompanying Rail orders, 1908 delivery, 1.50c.; car lots, 1.60c. to 1.70c.; Spikes, 1.80c. to 1.90c., according to delivery; Track Bolts, 2.25c. to 2.35c., base, Square Nuts, and 2.40c. to 2.50c., base, Hexagonal Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb., $28; 20-lb., $29; 16-lb., $30; 12-lb., $31. Standard Sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—Less business was developed last week in Structural Shapes than has been the case for some time, and most of the inquiries received concern small projects of unimportant tonnage. The only closures reported were for 600 tons of bridge material placed by the Chicago, Milwaukee & St. Paul Railroad, of which the Wisconsin Steel Company secured 300 tons, the remaining 300 tons going to the Minneapolis Steel & Machinery Company. The prospect for the immediate future lends small encouragement for the development of a large amount of business, since there are few bridge or structural enterprises involving large tonnage that promise early closure. The low bids offered on some recent contracts give evidence of the keenness of competition among fabricators; in many instances it is impossible to distinguish any margin of profit in the prices named. Structural specifications are coming out slowly, and though the mill at the South Works is still in operation it is occupied in part at least with stock orders. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras.

Plates.—New orders are not only scarce, but they continue to comprise only small lots for immediate use. Stock orders from jobbers are limited to sorting up lots absolutely required to maintain an unbroken assortment of stock sizes. Regular mill prices are being maintained except for occasional concessions of $2 to $3 made on narrow sizes by a few mills. We quote mill shipments as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.10c. to 2.20c.; from 72 to 96 in. wide, 2.20c. to 2.30c.; 3-16 in. up to 60 in. wide, 2.20c. to 2.35c.; 72-in. wide, 2.40c. to 2.50c.; No. 8 up to 60 in. wide, 2.20c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—Owing to a sharp falling off in the demand for Sheets in this market during the last two weeks of the month, business for May failed to equal the tonnage for the preceding month. There is little doing in the heavier gauges, what movement there is being mainly concentrated upon light Roofing Sheets, both Black and Galvanized. Jobbers and manufacturing consumers continue the policy of buying in small lots for present requirements. Prices remain unchanged and are generally well maintained. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 1.98c.; No. 12, 2.05c.; No. 14, 2.08c.; No. 16, 2.18c.; Box Annealed, Nos. 17 to 21, 2.43c.; Nos. 22 to 24, 2.48c.; Nos. 25 and 26, 2.53c.; No. 27, 2.58c.; No. 28, 2.68c.; No. 29, 2.78c.; No. 30, 2.88c.; Galvanized Sheets, Nos. 10 to 14, 2.63c.; Nos. 15 and 16, 2.83c.; Nos. 17 to 21, 2.98c.; Nos. 22 to 24, 3.13c.; Nos. 25 and 26, 3.33c.; No. 27, 3.53c.; No. 28, 3.73c.; No. 30, 4.23c.; Black Sheets from store: Blue Annealed, No. 10, 2.20c.; No. 12, 2.25c.; No. 14, 2.30c.; No. 16, 2.40c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3c.; Nos. 18 to 20, 3.15c.; Nos. 22 to 24, 3.30c.; No. 26, 3.50c.; No. 27, 3.70c.; No. 28, 3.90c.; No. 30, 4.40c. to 4.45c.

Bars.—A reduction of $4 a ton on Steel Bars was announced on Tuesday, which drops the price from 1.60c. to 1.40c., Pittsburgh, and from 1.78c. to 1.58c., Chicago. In the absence of any authoritative advice it is assumed that Iron Bars will at least recede to the same level. It is too early to know what the effect of this unexpected concession will have in stimulating trade, but favorable results are hoped for. Whether or not the fact that the time is at hand for the closure of implement makers' contracts for the coming season's requirements was considered in the action taken, it none the less occurs opportunely for these interests. Practically no new business either in Iron or Steel Bars has been entered for the past two weeks. The very moderate tonnage coming to the mills is supplied by specifications on the few remaining contracts yet unfilled. Revised prices, Chicago, are as follows: Steel Bars, 1.58c., with half extras; Iron Bars, 1.58c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.68c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands,

2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—While some improvement is noted from week to week and month to month in the volume of business entered, the margin of gain is too narrow to admit of notable progress. Orders keep coming in in the same conservative way, jobbers buying only what is actually needed for current requirements. Judging from the smallness of their orders, their stocks are likewise moving slowly. Prices hold firm, and they are reported by the mills as being absolutely maintained. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, ¾ to 6 in., 61.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 71 per cent. on Black Steel Pipe, ¾ to 6 in. From two to three points above these prices is asked for Iron Pipe.

Boiler Tubes.—Trade in Merchant Tubes is restricted to the immediate requirements of the boiler shops, which are extremely light. The same conditions prevail in Locomotive Tubes, there being but little demand from the railroads. Mill quotations for future delivery, on the base sizes, are as follows: 2⅜ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.	35	35	35
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	35
2¾ to 5 in.	60	47½	47½
6 in. and larger	50	35	..

Merchant Steel.—Nothing more than a very moderate business in routine orders from manufacturers and jobbers is being entered; nor are specifications being furnished with encouraging promptness. Although the season is close at hand for inquiries from implement makers concerning contracts for the new season, nothing is heard from these sources. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish up to 1½ x ½ in., 1.93c., base, Steel card; Iron Finish, 1½ x ½ in. and larger, 1.78c., base, Tire card; Channels for solid Rubber Tires, ¾ to 1 in., 2.28c., and 1⅛ in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46½c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Shafting, 56 per cent. off in car lots; 52 per cent. in less than car lots, base territory delivery.

Cast Iron Pipe.—The week has been barren of results as far as the closure of any large contracts is concerned. Miscellaneous orders comprising small lots have been fairly numerous, but no new lettings of considerable tonnage are reported as in sight for the immediate future. It is expected that the firming up of the Pig Iron market will favorably affect Pipe prices, which under the stress of competition have reached an unduly low level. We quote, nominally, per net ton, Chicago, as follows: Water Pipe, 4-in., $27; 6 to 12 in., $26; 16-in. and up, $25; with $1 extra for Gas Pipe.

Metals.—Measured by the actual amount of business transacted, the market shows no improvement, but an encouraging feature of last week's developments was the appearance of several inquiries from some large consumers for round lots to cover forward requirements. An advancing tendency of a positive nature, it is believed, would bring many buyers into the market; but as long as the price holds at the present level there is, under the circumstances, nothing to induce the anticipation of future wants. Lead is a trifle stronger, but in the main prices on both old and new Metals are unchanged. We quote as follows: Casting Copper, 13¼c.; Lake, 13½c. to 13¾c. in car lots for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 32c.; small lots, 32½c.; Lead, Desilverized, 4.45c. to 4.50c., for 50-ton lots; Corroding, 4.80c. to 4.90c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 5c.; Cookson's Antimony, 10½c., and other grades, 9¾c. to 10¼c.; Sheet Zinc is $7 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 12¾c.; Heavy Copper, 12¾c.; Copper Bottoms, 10½c.; Copper Clips, 11c.; Red Brass, 11½c.; Yellow Brass, 9¾c.; Light Brass, 6½c.; Lead Pipe, 4c.; Zinc, 3¾c.; Pewter, No. 1, 21c.; Tin Foil, 25c.; Block Tin Pipe, 27c.

Old Material.—Due mainly to competition among dealers, the market has recorded an advance in nearly all grades of 25c. to 50c. a ton. On two items—Rerolling Steel Rails and Heavy Melting Steel—the upward tendency has been strengthened by a demand from consumers, but with this exception it is almost wholly a dealer's market. The American Steel Foundries bought a considerable tonnage of Heavy Melting Steel, and a local mill has been bargaining for an additional supply of Rerolling Rails. Very little material has been offered by the railroads in the past two or three weeks, and only one list, that of the Great Northern, including a moderate tonnage, is up for distribution this week. Considering the large amount of material now stored in dealers' yards, and the little demand there is for it, it seems doubtful if even the present slight advance can be long maintained unless supported by an actual consumptive demand. We quote, per gross ton, f.o.b. Chicago, as follows:

Old Iron Rails	$15.50 to $16.00
Old Steel Rails, rerolling	13.50 to 14.00
Old Steel Rails, less than 3 ft.	12.25 to 12.50
Relaying Rails, standard sections, subject to inspection	19.00 to 20.00
Old Car Wheels	13.00 to 13.50
Heavy Melting Steel Scrap	11.50 to 12.00
Frogs, Switches and Guards, cut apart	11.75 to 12.25
Mixed Steel	9.50 to 10.00

The following quotations are per net ton:

Iron Fish Plates	$13.50 to $14.00
Iron Car Axles	16.50 to 17.00
Steel Car Axles	14.75 to 15.25
No. 1 Railroad Wrought	11.25 to 11.75
No. 2 Railroad Wrought	10.00 to 10.50
Railway Springs	11.00 to 11.50
Locomotive Tires, smooth	12.75 to 13.25
No. 1 Dealers' Forge	9.50 to 10.00
Mixed Busheling	6.75 to 7.25
Iron Axle Turnings	5.75 to 6.25
Soft Steel Axle Turnings	5.75 to 6.25
Machine Shop Turnings	5.50 to 6.00
Cast Borings	4.50 to 5.00
Mixed Borings, &c	4.50 to 5.00
No. 1 Mill	6.50 to 7.00
No. 2 Mill	5.50 to 6.00
No. 1 Boilers, cut to Sheets and Rings	7.00 to 7.50
No. 1 Cast Scrap	11.75 to 12.25
Stove Plate and Light Cast Scrap	10.00 to 10.50
Railroad Malleable	10.25 to 10.75
Agricultural Malleable	9.75 to 10.25
Pipes and Flues	7.75 to 8.25

E. S. Jackman & Co. is the new name of the Chicago agency of the Firth-Sterling Steel Company. E. S. Jackman announces that his brother, D. E. Jackman, formerly of Pittsburgh, joined the Chicago agency May 1 and that the firm's name has been changed accordingly. The warehouse is located at 164 to 168 West Lake street.

Philadelphia.

PHILADELPHIA, PA., June 2, 1908.

There has been a continued strong demand for Pig Iron, and sales have in some cases been larger than in the previous week. Many of the transactions have a speculative appearance, consumers taking tonnage beyond their immediate requirements or for business in sight, owing to their belief that prices can not under existing circumstances recede very materially. It is hardly probable that buying of this character can be maintained for any length of time, inasmuch as the actual amount of business coming to the steel mills, foundries, machine builders and industrial plants, does not as yet show an increase sufficient to warrant heavy buying, and while some few plants show a betterment the larger number are still unable to get their production much above the 50 per cent. mark. Sentimentally, the market is decidedly better. Sellers of Pig Iron are firm on prices, and in many cases refuse to do business for forward delivery or even spot deliveries in any quantity, at to-day's prices. The demand for finished materials does not appear to improve to any marked extent. Some of the deferred business, held up until the question of prices was settled, has come out, but the tonnage is not large, and mills do not show much gain. Structural Material has probably been the most active. The reduction in the price of Steel Bars made in the West will no doubt lead to the meeting of those prices in the East, although some mills have for some time been selling Iron Bars at lower figures than established quotations. There has been a little more buying of Steel Scrap and the Old Material market has a somewhat better tone.

Pig Iron.—Buying continues active, consumers placing orders quite freely for both prompt and forward delivery. Sellers in a number of instances report the largest aggregate tonnage of sales for some time and a few have practically withdrawn from the market. Some are refusing to quote on Iron for prompt delivery, while others will not consider business for forward shipment. The Foundry grades continue to command the greatest attention and sales ranging from 100 tons up to lots of several thousand tons, for various deliveries, are reported. Eastern Pennsylvania No. 2X Foundry has been sold in round tonnages at $16.75, delivered, for shipment up to September 1, but advances of 50c. are obtained for delivery during the entire last half of the year, while for deliveries during the last quarter alone some sellers hold for $1 a ton advance. Larger sales of Southern Foundry Iron are announced. One lot of 3000 tons and another of 1000 tons were sold to local pipe foundries for June and July delivery, at the $11.50 f.o.b. Birmingham basis. Several other sales of smaller lots made on the same basis are also reported. Pipe makers still have a number of inquiries in the market, one of which is reported to be for 10,000 tons for delivery during the third quarter. Virginia Irons have been more active. Sales of 2500 tons of No. 2X Foundry, composed of several lots for third quarter delivery, have been made at $17.50, delivered, while a lot of 1000 tons for shipment during the fourth and part of the first quarter of

1909 was sold at $17.75, delivered. Moderate lots of No. 2 Plain have been sold for third quarter delivery at $17.25, while sales of No. 2X and No. 2 Plain, ranging up to several hundred tons, were sold at $17 and $16.75, delivery, respectively. A sale of 2500 tons of Virginia Basic, for Western shipment, during the fourth quarter and first quarter of next year, was also closed, the price being equivalent to about $16, delivered, in this territory. Locally, the demand for Steel making Irons has been pretty quiet, mills still having considerable Iron due them on old contracts. There has been some inquiry, however, and business may develop in this line before a great while. A sale of 1000 tons of Low Phosphorus is reported, for Western shipment, the price being equal to $21.25, delivered, in this territory. Forge Iron has not been active, and prices for this grade range close to $15.25, delivered. Inquiries are still numerous. Some firm offers have been made by melters but the prices are not satisfactory to sellers, who are not inclined to load up tonnage even at the present prices. There seems to be no increase in the production of Pig Iron in this territory, and stocks at some of the furnaces are not large, so that any material increase in bookings would necessitate the blowing in of furnaces, which is not considered advantageous at the ruling prices. Sellers look for a moderation in the buying movement in the near future unless the railroads come into the market or more activity is shown in general business, as it is believed that melters have in many cases bought in excess of their present needs. Prices have been very firm, and, while unchanged for prompt shipments, advances of 50c. to $1 a ton are obtained by the majority of sellers, for deliveries ranging over the last half of the year. For prompt deliveries in buyers' yards, Eastern Pennsylvania and adjoining territory, the following quotations are named:

Eastern Pennsylvania, No. 2 X Foundry	$16.75 to $17.25
Eastern Pennsylvania, No. 2 Plain	16.25 to 16.75
Virginia, No. 2 X Foundry	17.00
Virginia, No. 2 Plain	16.50 to 16.75
Gray Forge	15.25 to 15.50
Basic	16.00 to 16.25
Low Phosphorus	21.00 to 21.25

Ferromanganese.—The demand is still light, and with the exception of a sale of 500 tons at about $45, seaboard, for delivery during the last half, the business transacted has been extremely small. Prices have an upward tendency, and sellers now quote $46 to $46.50, Baltimore, for last half deliveries.

Billets.—While there was more inquiry last week, but little actual business developed, and it is believed the prospective buyers were simply feeling the market. Shipments on the part of the mills have decreased, and stocks are in some cases increasing. Prices are being maintained. For Ordinary Rolling Steel Billets, delivered in this territory, $29.20 is quoted, with Forging Billets at $31.20, subject to the usual extras for high carbons and special sizes.

Plates.—Little change is to be noted in the demand for Steel Plates. Some fair inquiries for moderate lots of Boat and Tank Steel are out, but orders are not placed promptly. The bulk of the business taken by the mills is small, and of a miscellaneous character, and but little gain has been made in production. Prices are unchanged, the following range being quoted for delivery in this territory:

	Carload. Cents.	Parts carload. Cents.
Tank, Bridge and Boat Steel	1.85	1.90
Flange or Boiler Steel	1.95	2.05
Commercial Firebox	2.05	2.10
Marine	2.25	2.30
Locomotive Firebox Steel	2.35	2.40

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G.	.15
No. 9, B. W. G.	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00

Structural Material.—There has been a fairly even demand for Structural Material. Business, while largely of a small and miscellaneous character, is placed pretty freely, and there is a fair amount of bridge and building work of a moderate size before the trade. Some of the larger propositions under consideration are slow in development. No change is to be noted in the price of the usual range of Shapes, quotations running from 1.85c. to 2c., according to specification.

Sheets.—Buyers show a more active interest in the market, and orders have been placed for a number of small quantities for prompt shipment. No disposition is shown to buy for forward delivery, inasmuch as under the present conditions practically no difficulty is experienced in getting quick shipments from the mills. The aggregate tonnage taken during the week has been somewhat larger, and mills show some little improvement in production. For mill shipments prices range as follows, a tenth extra being added for small lots: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 to 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—There is but little demand. The market is unsettled, and, if anything, weaker. The reduction of $4 a ton in the price of Steel Bars in the West will no doubt be met by the mills in the East. In fact, Refined Iron Bars have been on the market for some time at prices materially under the established basis. The tonnages taken, however, have been small and for prompt shipment, and while the established price for Refined Iron Bars delivered in this territory is 1.65c., no difficulty is experienced in obtaining even small tonnages at 1.40c. to 1.50c., delivered.

Coke.—The demand for Coke has been more active, and some few contracts for moderate tonnages of Foundry Coke have been made. Furnace Coke has not been so active, although spot Coke has been offered rather freely at $1.50, at oven. For forward delivery $1.75 is about the best that can be done. Foundry Coke is unchanged at $2.15 to $2.35, at oven. We quote for delivery in this territory about as follows:

Connellsville Furnace Coke	$3.65 to $3.90
Foundry Coke	4.30 to 4.50
Mountain Furnace Coke	3.25 to 3.50
Foundry Coke	3.90 to 4.10

Old Material.—A little more strength is shown in some grades of Old Material. Heavy Melting Steel has been taken more freely during the week, one melter taking 5000 tons and another 500 tons for early delivery, the price in each case being $13.50, delivered. Another melter has picked up several odd lots of this grade at prices ranging from $13.25 to $13.50. Turnings and Borings have been in better demand, but the rest of the list has been somewhat neglected. Quotations are largely nominal, and range about as follows, for prompt deliveries in buyers' yards, eastern Pennsylvania and nearby territory:

No. 1 Steel Scrap and Crops	$13.00 to $13.50
Low Phosphorus	17.50 to 18.00
Old Steel Axles	18.00 to 18.50
Old Iron Axles	20.00 to 21.00
Old Iron Rails	18.00 to 18.50
Old Car Wheels	14.00 to 15.00
Choice No. 1 R. R. Wrought	15.00 to 15.50
Machinery Cast	14.50 to 15.00
Wrought Iron Pipe	11.50 to 12.00
No. 1 Forge Fire Scrap	11.50 to 12.00
No. 2 Light Iron	9.00 to 10.00
Wrought Turnings	9.50 to 10.00
Stove Plate	11.00 to 11.50
Cast Borings	8.50 to 9.00
Grate Bars	11.75 to 12.25

Birmingham.

BIRMINGHAM, ALA., June 1, 1908.

Pig Iron.—The market continues active and quotations on deliveries for this month and the third quarter have been advanced to $12, Birmingham, for No. 2 Foundry. This basis has been adopted by all makers who are in position to deliver Iron within the period specified, and transactions reported for the week fail to evince a disposition to depart from the schedule of prices thus established. One of the leading interests that has disposed of its output for the third quarter has adopted a schedule of $12.50, Birmingham. Another large producer quotes $12.50, Birmingham, for the last quarter, and at least two others would accept orders for delivery covering the last half of the year only at figures around such a basis. One of the smaller makers, whose output until September 1 has been disposed of, quotes firmly at $12 for the third quarter, but refuses to accept orders for delivery further advanced. This company reports the sale of approximately 10,000 tons within the past week at $11.50, and an aggregate of 3000 tons at $12, and 1000 tons of anaylsis Iron at figures equivalent to $12.50, Birmingham, for No. 2 Foundry. The delivery of the entire tonnage is not to extend beyond the third quarter. The sale of 35,000 tons of Basic Iron at $12, Birmingham, is reported, and will be produced by capacity heretofore operated on Foundry grades. It is notable that the quantity of Foundry Iron in the hands of merchants has not been increased by recent transactions. The tonnage involved in some instances reached significant proportions, but shipping instructions furnished were such as to indicate that requirements only had been provided for. However, the fact remains that the territory covered by Southern producers since the inception of the buying movement is unusual, and the condition of the Southern market can hardly be considered an index to the condition of the general Foundry trade.

Cast Iron Pipe.—With the volume of new business in sight steadily increasing, and the Pig Iron market on a firmer basis, the condition of this market could hardly be more encouraging. The output of present producing capacity is reported taken care of for some months in advance, and in view of the indications that a turning point in prices has been reached, some hesitancy is noted in efforts to increase the proportions of order book requirements. It is reported that three manufacturers will probably withdraw from the market for July and August deliveries. The prices received for the tonnage to be placed within the next fort-

night will no doubt materially affect the attitude of all parties concerned. Transactions reported for the week indicate a maintenance of quotations, but the quantity involved in each instance was comparatively small. We quote the following for Water Pipe, per net ton, f.o.b. cars here: 4 to 6 in., $23; 8 to 12 in., $22; over 12-in., average $21, with $1 per ton extra for Gas Pipe. These quotations are probably shaded for municipal contracts.

Old Material.—Consumers of all grades manifest more interest, while the scarcity of low grade Foundry Iron has created such a demand for Stove Plate and Light Cast that practically all accumulations have been depleted. The movement of Wrought Iron and Steel Scrap is also worthy of note, and dealers have replenished their stocks in small proportions. Quotations are firmer, and we quote as follows, per gross ton, f.o.b. cars here:

Old Iron Rails	$15.00 to $15.50
Old Iron Axles	14.00 to 15.00
Old Steel Axles	12.50 to 13.00
No. 1 Railroad Wrought	12.00 to 12.50
No. 2 Railroad Wrought	9.00 to 9.50
No. 1 Country Wrought	10.50 to 11.00
No. 2 Country Wrought	9.50 to 10.00
Wrought Pipe and Flues	8.50 to 9.00
No. 1 Steel	9.50 to 10.00
No. 1 Machinery	9.00 to 9.50
Stove Plate and Light Cast	8.50 to 9.00
Cast Borings	5.00 to 5.50

Pittsburgh.

PARK BUILDING, June 3, 1908.—(*By Telegraph.*)

Pig Iron.—Inquiries now are mostly for small lots, but the tone of the market is firm, especially on Basic, due to the recent heavy sales. In the Mahoning and Shenango valleys seven stacks are now in blast, these being Nos. 3 and 4 of Shenango Furnace Company, at Sharpsville, on Bessemer, the latter stack having started May 28; Youngstown Steel, on Bessemer; Dover and Struthers, on Basic; Andrews & Hitchcock, on Foundry, and Stewart Iron Company, on Low Phosphorus. We quote Bessemer Iron at $16; Malleable Bessemer, $15 to $15.25; Basic, $15.25 to $15.50; No. 2 Foundry, $15, and Northern Forge, $14, all f.o.b. Valley furnace, the freight rate to Pittsburgh being 90c.

Steel.—There is absolutely no new demand for Billets or Sheet or Tin Bars, but a fair amount of tonnage is being taken out in specifications against contracts. We quote $28, Pittsburgh, and $28.50, Youngstown or Wheeling, for Bessemer and Open Hearth Billets; Sheet and Tin Bars taking $1 advance, and Forging Billets $2 advance.

(*By Mail.*)

At a meeting of the large Steel interests, held in New York on Monday, it was decided to reduce the price of Steel Bars from 1.60c. to 1.40c., effective at once. It is understood that the principal reasons advanced for the reduction in prices were, first, the differential that has existed for some time of $3 to $4 a ton in favor of Iron Bars, and, second, the fact that usually about this time the Agricultural Implement makers and Wagon makers come in the market and cover their requirements for a year ahead. It was feared that if no reduction was made in prices of Steel Bars these large interests would make contracts for Iron Bars. The opinion is now stronger than ever that reductions on other lines of finished products, such as Structural Steel, Plates, &c., are inevitable. Consumers of Iron and Steel will very likely regard the reduction in prices of Steel Bars as simply a forerunner of reductions that are to be made on other products and will hold off and not buy a pound of material other than what they absolutely need. Following the heavy purchases of Pig Iron about two weeks ago, the market has quieted down very much. While there is a fair inquiry, sales the past week have been light, and only for small lots. Steel Billets and Sheet and Tin Bars are absolutely lifeless, as far as new demand is concerned, but a fair amount of tonnage is being taken out in specifications, May showing an increase of about 10 per cent. over April with one large producer. The demand for Finished Iron and Steel continues very quiet, and is altogether for small lots for actual needs.

Ferromanganese.—Some fairly large inquiries are in the market for delivery over the last half of the year, and prices are firmer than for some time. We quote 80 per cent. foreign Ferro at $44.50 to $45, seaboard, the freight rate to Pittsburgh being $1.90 a ton. A sale of 50 tons for June and July shipment is reported at $44.50, seaboard.

Ferrosilicon.—The inquiry for 300 tons noted last week has not yet been closed, but in the meantime prices have gone up fully $2.50 a ton. We quote 50 per cent. at $70, f.o.b. Pittsburgh, and can report sales of about 75 tons at that price.

Muck Bar.—In the absence of sales we quote best grades of Muck Bar, made from all Pig Iron, at nominally $26 a ton.

Skelp.—Some small tonnage in Steel Skelp has recently been closed, but the general market is quiet. Prices are nominally as follows: Grooved Steel Skelp is 1.55c. to 1.60c; Sheared Steel Skelp, 1.65c. to 1.70c.; Grooved Iron Skelp, 1.75c. to 1.80c.; Sheared Iron Skelp, 1.85c. to 1.90c., Pittsburgh.

Rods.—The extreme quietness in the Wire trade is reflected in Rods, for which there is practically no new demand. Regular prices on Rods are $35 for Bessemer, $36 for Open Hearth, and $37 for Chain Rods, f.o.b. Pittsburgh, but not enough tonnage is being placed to test the market.

Structural Material.—The material for the Pittsburgh & Lake Erie bridge, at Beaver, about 13,500 tons, and the Delaware, Lackawanna & Western shops, at Scranton, about 4000 tons, taken by the McClintic-Marshall Construction Company, has nearly all been placed, being divided between the Jones & Laughlin Steel Company and the Carnegie Steel Company. No local work has been placed in the past week, and little is in sight, outside of the new Horne Building, 2500 to 3000 tons, but which may not come up for some time. The reduction of $4 a ton in prices of Steel Bars will likely lead to still lower figures being made for erection. We quote plain material as follows: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x ¼ in. thick, up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c.; Bulb Angles and Deck Beams, 2c. Under the Steel Bar card, Angles, Channels and Tees under 3 in. are 1.50c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Steel Rails.—The Carnegie Steel Company has received in the past week specifications against old contracts for Standard Section Rails amounting to about 4000 tons, but no new tonnage of moment has been placed. The demand for Light Rails has quieted down, the Carnegie Steel Company having taken about 700 tons in the past week. Nos. 1 and 2 Rail mills of the Carnegie Steel Company, at Bessemer, are in operation to about 30 to 35 per cent. of capacity on Standard Sections, but No. 3 mill, on which Light Sections are rolled, is still shut down. It is said that Light Rails made by rerolling mills have recently sold below $23 a ton. Regular prices on Light Rails are as follows: 25 to 45 lb. Sections, $28; 20-lb., $29; 16-lb., $30, and 12-lb., $32. We quote Standard Sections at $28, at mill, and Angle Splice Bars at 1.65c., at mill.

Plates.—Some additional tonnage in Plates, for the extensions to the water system of the city of Seattle, Wash., has been placed with the Carnegie Steel Company through James McNeil & Brother of this city, who have taken the contract for the building of some of the mains. The general demand for Plates is dull, and only small orders for material needed for current work are being placed. Large consumers like the car builders and others are buying practically nothing. On narrow sizes prices are being shaded about $2 a ton by some of the smaller mills. Regular prices are as follows: Tank Plates, ¾-in. thick, 6¼ in. up to 100 in. wide, 1.70c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in. Plates on thin edges	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40

Shell grade of Steel is abandoned.

TERMS.—Net cash 30 days. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes, 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—New Sheet orders are small and are only for such tonnage as is needed for current work. The consuming trade evidently believes that a reduction in prices of Sheets is not improbable, and for this reason is holding off. It is claimed, however, that any concessions in prices that are being made are by a few of the smaller mills and that, in the main, regular prices are being maintained, as follows: Blue Annealed Sheets, No. 10 and heavier, 1.80c.; Nos. 11

and 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 2c.; Box Annealed, Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.60c.; No. 30, 2.70c. Galvanized Sheets: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.65c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.70c.; No. 30, 3.95c. No. 28 Painted Roofing Sheets, $1.75 per square, and Galvanized Roofing Sheets, No. 28, $3.10 per square, for 2½-in. corrugations. These prices are subject to a rebate of 5c. per 100 lb. to the large trade under the usual conditions, jobbers charging the usual advances for small lots from store.

Tin Plate.—With indications good for a large fruit crop, the Tin Plate manufacturers expect a material improvement in demand shortly after July 1, when the canning trade usually places its contracts. We quote at $3.70 for 100-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, this price being subject to the usual rebate of 5c. per base box in large lots.

Hoops and Bands.—The reduction of $4 a ton in prices of Steel Bars will likely carry with it the same reduction in Steel Bands, which are sold on the Steel Bar card. Practically no new business is being placed, buyers holding off in the expectation that prices will be lower. While we have not reduced prices on Steel Bands, it is likely these will be put on the basis of 1.40c. within a day or two, to conform to the new price of Steel Bars. Regular prices in effect to-day (Tuesday) are as follows: Steel Hoops at $2, base, full Hoop card extras; Steel Bands, $1.60c, base, half Steel card extras, all f.o.b. cars, Pittsburgh, in carload lots, for delivery during 1908.

Cotton Ties.—The tonnage so far placed in Cotton Ties is said to be not over 50 to 60 per cent. of what it was at this time last year. We quote as follows: 3000 bundle lots and over, 85c.; less than 3000 bundle lots, 88c., f.o.b. Pittsburgh.

Iron and Steel Bars.—On Monday the large Steel Bar interests in session in New York City reduced prices of Steel Bars $4 a ton, or to a basis of 1.40c., Pittsburgh. It is probable the Bar Iron makers will also reduce prices this week, but whether it will be to the basis of 1.40c., the same as Steel Bars, or to 1.30c., which latter price would maintain the differential existing for some time in prices of Iron Bars over Steel Bars, cannot be stated at this writing. It is hoped the reduction in Steel Bars will stimulate the demand. It is understood that the new price of 1.40c. is in effect only to October 1, to the general trade, but large consumers, like the Implement makers and the Wagon makers, will be allowed to contract for their full year's supply from July 1 at the new price. The reduction in Steel Bars has complicated the settlement of the Amalgamated wage scales for puddling and finishing mills, and it is probable the mills will ask for a heavy reduction in the present scale, which expires on June 30. At this writing (Tuesday p.m.) the Amalgamated Association is in conference with the Western Bar Iron Association at Cambridge Springs, Pa., in an attempt to settle wage scales for the year beginning July 1, but it is doubtful if an agreement will be reached, unless the men agree to accept a material reduction. We quote Iron Bars at 1.50c. for the Pittsburgh District, and 1.47c., Pittsburgh, for Chicago and points further west. Steel Bars remain firm, at 1.60c., Pittsburgh.

Spelter.—The Spelter market seems to be completely demoralized, owing to lack of demand and heavy production, and prime grades of Western are reported as having been offered as low as 4.30c., St. Louis, or 4.42½c., Pittsburgh.

Railroad Spikes.—There is a fair demand for the smaller sizes, but for standard sizes practically no orders are being placed. We quote: Standard sizes, 4½ x 9-16 in., at $1.70, and the smaller sizes at $1.80 per 100 lb. in carload and larger lots, with an advance of 5c. per 100 lb. for less than carload, f.o.b. Pittsburgh.

Merchant Steel.—Implement and vehicle makers are buying only for actual needs and in very small lots. Whether the reduction in price of Steel Bars will be followed by reductions in prices on the different grades of Merchant Steels is not known now, but it is probable that the whole market will be readjusted. Prices in effect at this writing are as follows: Cold Rolled Shafting, on contracts for 100 tons and over, 57 per cent. off; carloads, 56 per cent. off, and less than carloads, 52 per cent. off, on which carload freight is allowed within base territory. Nominal prices on Merchant Steel are as follows: Smooth Finished Machinery Steel, 1.80c. to 1.90c.; Flat Sleigh Shoe, 1.75c. to 1.85c.; Cutter Shoe Steel, 2.15c. to 2.25c.; Toe Calk, 2.10c. to 2.15c.; Railroad Spring Steel, 1.60c. to 1.75c., the higher price being for Pennsylvania Railroad analysis. Carriage Spring Steel is 1.80c.; Tire Steel, Iron, finished, 1½ in. and wider, 1.60c.; under 1½ in., 1.75c. Planished Tire Steel is 1.80c., all f.o.b. at mill.

Pipes and Tubes.—It is stated emphatically by the Pipe interests that there will be no reduction in prices of Pipe, and that the trade runs no risk in placing orders. None of the large inquiries for gas and oil lines noted last week has yet developed into orders, but new business in May showed a material increase over April. Net discounts on Steel Pipe to the large trade on ⅜ to 6 in. remain at 74 and 5 per cent. off list, while on Iron Pipe the absolute minimum is 72 and 5 per cent. Discounts on Steel Pipe are as follows:

Merchant Pipe.

	Jobbers, carloads, Steel. Black.	Galv.
	%	%
⅛ to ¼ in.	65	49
⅜ in.	67	53
½ in.	69	57
¾ to 6 in.	73	63
7 to 12 in.	70	55
Extra strong, plain ends:		
⅛ to ⅜ in.	58	46
½ to 4 in.	65	53
4½ to 8 in.	61	49
Double extra strong, plain ends:		
½ to 8 in.	54	43

Discounts on Genuine Iron Pipe are as follows:

	Black.	Galv.
	%	%
⅛ to ¼ in.	63	..
⅜ in.	65	51
½ in.	67	55
¾ to 6 in.	71	61
7 to 12 in.	68	53
Extra strong, plain ends:		
⅛ to ⅜ in.	56	44
½ to 4 in.	63	51
4½ to 8 in.	59	47
Double extra strong, plain ends:		
½ to 8 in.	52	41

Boiler Tubes.—New buying is light. The railroads are placing few orders for Railroad Tubes, while demand for Merchant Tubes is from hand to mouth. Prices are somewhat uneven, regular discounts on Merchant Tubes in small lots, on which an extra 5 per cent. is allowed in carloads, are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	42	47
1¾ to 2¼ in.	42	59
2½ in.	47	61
2¾ to 3 in.	52	65
6 to 13 in.	42	59

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Iron and Steel Scrap.—A local producer of Low Phosphorus melting stock, but which has not been a seller for two or three years, has recently come in the market and sold from 6500 to 7000 tons, at prices equal to about $18 and higher, f.o.b. Pittsburgh. Part of this is guaranteed to run under point 0.04 in Phosphorus and part of it under 0.05. Other large sales by this interest are pending and will likely be closed this week. We also note that a local consumer has bought from 2500 to 3000 tons of Heavy Steel Scrap, at prices ranging from $13.50 to $14, Pittsburgh. However, the specifications for this Scrap are severe, the consumer using it in hand charged furnaces. No pieces over 5 ft. in length and 18 in. wide, or lighter than 25 lb. nor heavier than 100 lb., will be accepted. The Scrap must also be free of Steel Castings. Aside from the above, little has been done in the Scrap market in the past week. None of the large consumers like La Belle, Republic or Sharon Steel Hoop are taking in any tonnage at present. Dealers quote about as follows per gross ton: Heavy Steel Scrap, Pittsburgh, Steubenville or Sharon delivery, $13 to $13.25; Cast Borings, $7.25 to $7.50; No. 1 Railroad Wrought, $13.25 to $13.50; No. 1 Cast, $13.75 to $14; Bundled Sheet Scrap, $8.50 to $9, at shipping point; Sheet Bar Crop Ends, $16 to $16.50; No. 1 Busheling Scrap, $12 to $12.25; No. 2, $9 to $9.25; Iron Axles, $19 to $19.50; Steel Axles, $16.50 to $17; Low Phosphorus Melting Stock, $17 to $17.50; Old Steel Rails, short pieces for Open Hearth use, $12.75 to $13; Rerolling Rails, lower in price, $13.50 to $13.75; Machine Shop Turnings, $8 to $8.25; Grate Bars, $12 to $12.50; Railroad Malleable Scrap, $11.25 to $12. We note sales of 400 tons of Old Car Wheels at a price equal to about $13.50, Pittsburgh, and 100 tons of Old Iron Rails at a price equal to about $17, Pittsburgh.

Coke.—Inquiries for both Furnace and Foundry Coke are a little better, and more ovens have been fired. The Stewart Iron Company has started 100 ovens and the Bessemer Coke Company has started the same number at its Griffin Works. The H. C. Frick Coke Company has started work on the building of four new Coke plants in the Connellsville region, which will give work to hundreds of men for some months. We quote Connellsville Furnace Coke for prompt shipment at $1.50 to $1.60, while on contracts for delivery over last half of the year as high as $1.75 is asked. Foundry Coke is held at $2 to $2.25 for Connellsville grades, while outside makes are offered as low as $1.75, at oven. The output last week in the Upper and Lower Connellsville regions was about 170,000 tons, a decrease over the previous week of 3000 tons.

The new turbine steamship Mauretania of the Cunard Line broke the record last week by sailing 635 miles in one day, thus averaging 25.40 knots. This was done with one blade of the propeller broken.

San Francisco.

SAN FRANCISCO, CAL., May 27, 1908.

The jobbing situation in Iron, Steel and Pipe is more satisfactory than at the opening of the year. While the local foundries and machine shops are not so busy as they should be at this season, the resumption of work at some of the tributary Copper mines and the preparations for the starting up of more smelters have stimulated the market for Steel Bars, Tool Steel, Steel Castings, &c. Pipe and fittings of all kinds are also in fair demand. The recent increase of 5c. per 100 lb. in the price of Lead by the Selby Smelting & Lead Company indicates improvement. The building situation is quite encouraging, there being a large volume of work in progress, with many good inquiries. The use of metal doors and windows is now the regular thing for high class buildings, and Steel ceilings are becoming more popular. The Western Pacific Railroad has received all of the Steel for the completion of the ferry slips at Oakland, Cal., and is also getting large quantities of Steel Rails for the early laying of tracks to tidewater. The fruit crops are looking well, and money will soon be more plentiful for building and new enterprises of all kinds. Collections are good.

Structural Materials.—While comparatively little Steel is being erected in this city at present, and lack of ready money is preventing the closing of contracts for several large buildings, there is a good deal of inquiry for small lots. The American Bridge Company has taken a contract for 1000 tons for the new Library Building of the University of California at Berkeley. The foundations are already in for this fine structure, which will be constructed without unnecessary delay. A great deal of massive granite work and elaborate stone carving are included in the plans for this building. The American Bridge Company has also a 200-ton contract for the six-story Graff Building, which is being erected on Post street, in this city.

Pig Iron.—Although there has not yet been a marked improvement in the demand for Iron castings at the local foundries and engineering works, there are indications of better times, and increased buying of Pig Iron may be expected in the near future. Arrivals have been light the past month, but there is enough stock on hand to supply the city for some time. The bark René arrived May 19 from Newcastle, England, with 1080 tons of Pig Iron consigned to a local importer. No. 1 English, No. 1 Scotch and Chinese Pig Iron are quoted in this market at about $28 to $29 per ton, ex-yard.

Merchant Pipe.—There is a good demand for Merchant Pipe and prompt deliveries are being made by the railroads on shipments from the East to supply the Coast jobbers. Prices are well maintained. There has been an advance on cast fittings. Discounts on Steel Pipe are about as follows on jobbers' carloads:

	Steel. Black	Steel. Galv.
	%	%
⅛ to ¼ in	58.5	42.5
⅜ in	60.5	46.5
½ in	62.5	50.5
¾ to 6 in	66.5	56.5
7 to 12 in	63.5	48.5
Extra strong, plain ends:		
⅛ to ⅜ in	51.5	39.5
½ to 4 in	58.5	46.5
4½ to 8 in	54.5	42.5
Double extra strong, plain ends:		
½ to 8 in	47.5	36.5

Cast Iron Pipe.—Bids have been taken for several Cast Iron Pipe contracts of moderate size, and there are some fair inquiries. The use of Cast Iron Pipe by the military engineers in connection with new water developments in this State has been gratifying to the dealers. A small quantity of 6-in. was specified for the water system which is to supply the new Government coaling station at California Point, in San Francisco Bay. The bids are in for this. Bids are to be received up to June 1 by Major George McK. Williamson, constructing quartermaster, for the new water system at the Presidio Garrison, San Francisco. An entirely new water supply will be installed, including reinforced concrete reservoirs, pumping stations, &c. About 8100 ft. of 10 and 12 in. is called for. Two steam boilers, pumps and auxiliaries are also wanted. Bids were opened May 25 at San Bernardino for 4100 ft. of 12-in. for the municipal water system, and the United States Cast Iron Pipe & Foundry Company, R. W. Martindale, Pacific Coast manager, was awarded the contract. The water situation in San Francisco is getting to be a serious one, and notwithstanding the fact that the city is now taking active steps to secure a supply of mountain water from the Hetch Hetchy Valley, in the Tuolumne watershed, local conditions will be worse before such a municipal system can be completed. It is stated that the Spring Valley Water Company's present capacity to deliver water to the city does not exceed 35,000,000 gal. per day, and that such capacity can be increased only by laying an additional main from the storage reservoirs down the peninsula to the distributing reservoirs in the city, and, probably, some additions to the pumping plant. The bid of the United States Cast Iron Pipe & Foundry Company was the lowest for the 3000 ft. of 4-in. Pipe required by the city of Vallejo, Cal., for its water works. There has been little change in the market in the past month. Prices of Cast Iron Pipe, f.o.b. cars Pacific Coast terminal points, are about as follows per net ton: 6, 8, 10 and 12 in., $36; 4-in., $37.

Coke.—With the expected increase in the operations of smelters, especially on Copper Ore, the demand for the lower grades of Coke will increase. There are still large stocks of both Australian and English Foundry Coke in the jobbers' hands in this market. There is little change in prices, with only small transactions as a rule. The only recent arrival of Coke was 1800 tons from Newcastle, England. English Foundry Coke is quoted at about $14 to $15 per ton, ex-yard. German Syndicate and Australian Coke are sold at lower prices.

The Palace Hotel Company has awarded a $60,000 contract to the John G. Sutton Company, San Francisco, for the electric wiring and the temporary electric lighting plant for the new eight-story hotel on the corner of Market and New Montgomery streets. Chas. C. Moore & Co. have the power plant contract, including boilers, auxiliaries, &c., at $49,900, and the Westinghouse Electric & Mfg. Company has already delivered two large D. C. generators for this plant.

The Board of Public Works of Seattle, Wash., has rejected the bid of the Puget Sound Bridge & Dredging Company for the Cedar River pipe line as the company would not consent to take its payment for the work from the $2,250,000 bond issue recently authorized. The bid was for $1,263,982.

The present bridge crossing Lake Union at Latona, near Seattle, will be replaced within a year or two by a Steel structure costing approximately $1,000,000. The present bridge has been ordered removed by the War Department because of the necessity for a drawbridge on account of the construction of the proposed Lake Washington Canal. Detailed plans for the structure will be submitted by prominent bridge companies of the country.

St. Louis.

ST. LOUIS, June 1, 1908.

The responses to an organized propaganda on the part of leading merchants and manufacturers fixing upon June 1 as the date to make additions to their working forces have been of sufficient volume to indicate a decided improvement in the general situation. A canvass of the leading Iron interests, however, discloses quite an uneven state of business. Those having to depend mainly upon the railroads are still lacking orders of consequence, while companies supplying machinery, castings and industrial material are finding conditions improving. The best reports come from interests identified with supplies and appliances required in agricultural operations. Concerns dealing principally in farming districts state that their trade is about normal.

Coke.—An increased demand is reported for Coke, with but little change in prices. Some new business is being booked for immediate and future shipment.

Pig Iron.—Orders are being received, ranging from car lots to 500 tons. We note one order for 700 tons, and an inquiry for 2000 tons for shipment in first half 1909. Negotiations are pending for 5000 tons of Basic, and quite a satisfactory number of inquiries are coming daily for all deliveries. We learn that the price of $11.50, Birmingham, has been withdrawn, the minimum rate now being $12. It is further reported that some of the large furnace interests are holding for $12.50, Birmingham. Large sales of Pig Iron are being reported from the South. It is noteworthy that most of the sales in this territory are being made to consumers, rather than to brokers and others on speculative account.

Finished Iron and Steel.—The demand for Structural Steel is showing marked improvement, the number of inquiries being large, although in the main not for large quantities. Light Rails continue in demand from lumbering and mining interests, and specifications are liberal for immediate wants. Standard Rail business remains dull. Concerning the market buyers are divided as to their views regarding the recent decision to maintain prices, but sales are better for Bar products, and with the exception noted above the outlook is brighter than in the early spring for all classes of Steel products. Inquiries from railroads have been light, owing to rains and floods in the Southwest. With the better weather now prevailing, it is thought the coming week will witness an improvement in this demand.

Metals.—The slump in Tin and weakening in Copper have checked trade in Brasses, the demand for which had been slowly but steadily gaining in volume.

Old Materials.—With the starting up of the local mills of the American Car & Foundry Company, the Republic Iron & Steel Company, the Commonwealth Steel Company and others, causing a demand for Heavy Melting Steel, there has been some advance in prices. Relaying Rails, first class, Hunt's inspection, are being held by the railroads at $22.50

to $23.50 and are in demand. There are no railroad lists out yet for this month. We quote, f.o.b. St. Louis, per gross ton, as follows:

Old Iron Rails	$14.00 to $14.50
Old Steel Rails, rerolling	12.25 to 12.50
Old Steel Rails, less than 3 ft.	12.00 to 12.25
Relaying Rails, standard sections, subject to inspection	22.50 to 23.50
Old Car Wheels	13.00 to 13.50
Heavy Melting Steel Scrap	12.00 to 12.25
Frogs, Switches and Guards, cut apart	12.00 to 12.25
Mixed Steel	10.00 to 10.25

The following quotations are per net ton:

Iron Fish Plates	$12.00 to $12.25
Iron Car Axles	16.00 to 16.50
No. 1 Railroad Wrought	11.50 to 12.00
No. 2 Railroad Wrought	10.50 to 11.00
Railroad Springs	10.50 to 11.00
Locomotive Tires, smooth	13.00 to 13.50
No. 1 Dealers' Forge	9.50 to 10.00
Mixed Borings, &c	3.75 to 4.25
No. 1 Boilers, cut to Sheets and Rings	8.25 to 8.75
No. 1 Cast Scrap	10.00 to 10.50
Stove Plate and Light Cast Scrap	8.25 to 8.75
Railroad Malleable	10.00 to 10.25
Agricultural Malleable	8.50 to 9.50
Pipes and Flues	8.00 to 8.50

Cleveland.

CLEVELAND, OHIO, June 3, 1908.—(*By Telegraph.*)—Bar Iron manufacturers have reached an agreement reducing the price $3 per ton.

(*By Mail.*)

CLEVELAND, OHIO, June 2, 1908.

Iron Ore.—At a meeting of the independent vessel owners, held in this city yesterday, it was decided not to start their boats until June 16, with the exception of a few that have contracts to deliver cargoes. Another meeting will be held here on that date, and unless there has been a decided improvement by that time the general start in navigation will be put off until July 1. The Ore market is still lifeless. It was expected that the activity in Pig Iron would result in some buying of Ore without further delay, but that expectation has not yet been realized. While Ore men do not look for a great deal of buying this month, they believe that many of the furnace interests will come into the market soon for a portion of their requirements for the year. Shipments in June will be very light and it is estimated that the movement until July 1 will be 10,000,000 tons behind the same period last year. In April, May and June of last year the Ore shipments were 12,685,516 tons. More boats of the Pittsburgh Steamship Company were started during the past few days and about 25 boats, or a quarter of the vessels of that fleet, are in commission. Three of the leading merchant Ore firms have not yet started a boat. Another shipper has a few boats in commission. The estimate made a few weeks ago that not over 20,000,000 tons of Ore will be needed from the mines this year still holds, and vesselmen say that there will be no trouble in bringing down that amount of Ore even if the movement is very light until August. Then shipments can be rushed the remainder of the season. Very little Ore is going forward from the docks and the amount on docks May 1 has been diminished very slightly. Prices for 1908 delivery at Lake Erie docks, per gross ton, are firm, as follows: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesaba non-Bessemer, $4; Siliceous Bessemer, $2.75; Siliceous non-Bessemer, $2.35 to $2.60.

Pig Iron.—The activity in the Pig Iron market has continued the past week, and the large volume of inquiries still coming in indicates the sale of considerable tonnage the next week or two. The most of the buying has been of Foundry Iron, but some sales of Basic are reported, and the activity has extended to Malleable Iron. Bessemer alone remains quiet. While the buying is regarded to a certain extent as speculative, buyers as a rule are following a conservative policy and are covering for only about one-half of their expected requirements for the balance of the year. Prices are firmer and $15, Valley furnace, seems to be bottom price for No. 2 Foundry for the third quarter. Most of the interests are holding firmly at $15.25, Valley furnace, for the third quarter for No 2, and $15.50 is being asked for the last half. Local furnaces are holding firmly at $15.75 to $16, at furnace, for No. 2 Foundry for delivery in this territory. Three furnace interests report the sale during the week of about 7000 tons of Foundry Iron, mostly for third quarter delivery, but some for the entire last half. A large portion of the Iron was sold to consumers in this territory, the majority of them being in the market for Iron for a portion of their requirements. Many Foundry Iron inquiries are still pending for lots ranging from 100 to 1000 tons. The melt is improving in this territory, and shipments have increased considerably. We note the sale of 5000 tons of Basic Iron and 5000 tons of Malleable Iron at about $15.50, Ohio furnace. An offer of $15 for 6000 tons of Malleable Bessemer from a Buffalo car coupling manufacturer was rejected by a local interest. There are still pending some good inquiries for Basic and Malleable Iron, but the large consumers of Malleable have not yet come into the market. Among the inquiries is one for 1000 tons of Foundry and 1000 tons of Malleable for the first half of 1909. For prompt shipment and for third quarter we quote, delivered, Cleveland, as fololws:

Bessemer	$16.90
Northern Foundry, No. 1	$16.25 to 16.75
Northern Foundry, No. 2	15.90 to 16.25
Northern Foundry, No. 3	15.40 to 15.90
Southern Foundry, No. 2	16.35
Gray Forge	14.90

Coke.—The Foundry Coke market shows an improvement, and prices are firmer. Considerable tonnage has been sold for last half delivery. We quote 72-hr. Foundry Coke at $2.25, at oven, for last half delivery, and $2.15 for spot shipment. While the demand for Furnace Coke does not yet show an improvement, the market is firmer, because of the improvement in the Pig Iron situation. We quote Connellsville Furnace Coke at $1.75 to $1.85, at oven, for the last half.

Finished Iron and Steel.—Business in all Finished lines has been quiet, buying being confined to small lots for immediate needs. Mill agents to-day notified their customers of the reduction of $4 a ton in Steel Bars. It is expected that the lower price will stimulate the demand, and result in some increase in specifications. For the past month there had been persistent rumors that the price was being cut $2 a ton by one or more mills. Consumers of Structural Material and Plates now expect that a reduction will be made in the prices of those materials, and will probably be slow in placing orders until a cut is made, or they are satisfied that prices will be maintained. About the only improvement noted in the local demand past week has been in Structural Material, some fair specifications having been received from bridge building concerns. There is some Structural work in sight in the building line requiring small tonnages, but fabricators are taking that work at very low prices. The demand for Plates shows no improvement, and price cutting of $2 a ton is reported on both Light and Heavy Plates. Sheets are weak and in light demand, concessions of $1 to $2 a ton being made. Jobbers report a slight improvement in warehouse business. Pending a probable readjustment we quote Iron Bars at 1.50c. to 1.60c., Cleveland, for car lots. We quote Steel Bars. 1.50c., Cleveland, for car lots, half extras; Beams and Channels, 1.80c., base, Cleveland, and Plates, ¼-in. and heavier, 1.80c., base, Cleveland. Dealers quote Sheets, mill shipments, car lots, Cleveland, as follows: Blue Annealed, No. 10, 1.90c.; Box Annealed, No. 28, 2.60c.; Galvanized, No. 28, 3.65c. Warehouse prices are unchanged. We quote Iron and Steel Bars out of stock at 1.70c. to 1.80c.; Beams and Channels out of stock are 2.10c. to 2.15c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.10c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.85c. Warehouse prices on Boiler Tubes, 2¾ to 5 in., are 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—The improvement in the demand for Heavy Steel Scrap, as noted last week, has continued, and dealers have advanced the price of this Scrap and Steel Rails $1 a ton and over. The demand comes largely from the Pittsburgh District and mills in the Valley. There is also a slightly better demand for Bushelings, and their price is a little firmer. As far as local demand is concerned the market shows no improvement, but the spurt in Steel Scrap has stirred up some trading among dealers, and the whole list outside of Steel Scrap is possibly a little firmer, although prices remain about stationary. A small tonnage is offered this week by the Wheeling & Lake Erie Railroad. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails	$12.50 to $13.00
Old Iron Rails	14.50 to 15.50
Steel Car Axles	16.00 to 17.00
Old Car Wheels	12.50 to 13.00
Relaying Rails, 50 lb. and over	21.00 to 22.00
Heavy Melting Steel	12.00 to 12.50
Railroad Malleable	11.00 to 11.50
Agricultural Malleable	10.50 to 11.00
Light Bundled Sheet Scrap	7.50 to 8.50

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	$16.00 to $16.50
Cast Borings	5.00 to 5.50
Iron and Steel Turnings and Drillings	6.00 to 6.25
Steel Axle Turnings	7.50 to 8.00
No. 1 Busheling	10.50 to 11.00
No. 1 Railroad Wrought	11.00 to 12.00
No. 1 Cast	11.50 to 12.50
Stove Plate	10.00 to 10.50
Bundled Tin Scrap	8.00 to 9.00

Records kept by the steamship companies at New York show that in the first five months of 1908 but 153,027 immigrants landed at Ellis Island, as against 583,835 in the same period last year. The returns of immigrants to Europe this year had reached a total of 311,995 at the end of May, as against 114,137 for the first five months of 1907.

Cincinnati.

CINCINNATI, OHIO, June 3, 1908.—(*By Telegraph.*)

While with some sales agents the rather abrupt slump in inquiries for Pig Iron has suggested the usual dullness following a sudden buying movement, others predict that still lower levels than have been reached are inevitable, and that the ultra conservative buyers are holding off in that expectation. Aside from the Agricultural Implement makers, the Pipe people and some Stove manufacturers, there is indicated no early need for Iron, and with the prospect of five or six months of business inertia, with the Presidential programme to deal with, manufacturers and foundrymen who buy for actual requirements are not figuring very largely in the markets. The announcement that the large Steel manufacturers had reduced Steel Bars $4 a ton came as a distinct surprise to the trade. Inquiry of the seven or eight largest interests here in the jobbing line indicates that all will maintain store prices, which are 1.85c., and none believe that the reduction will bring out any business of consequence. It is understood here that the proposition affects favorably only the large Wagon makers and Agricultural Implement manufacturers, who can contract on the basis of 1.40c., Pittsburgh, to July 1, 1909, others being restricted to October 1, this year. A feeling exists also that there is something more on the inside which is yet to come out, and that the drop on Steel Bars is but the precursor of some larger and more vital doings. There is a little buying movement on in Heavy Melting Steel Scrap for export. The machine Tool market continues featureless.

Pig Iron.—Considerable uncertainty exists in this market, taking into consideration all factors having to do with the sale of Iron at this time—namely, the depleted condition of stocks on furnace yards, especially marked in the low grades, the firmness of the price governing the Southern product, now $12, Birmingham, for No. 2 Foundry, with an insignificant inquiry and the continued dullness of the machinery markets. There is no Southern Iron offered in this market less than $12, and some are asking $12.50. On low grades, but one agency was found willing to quote on No. 4 Foundry and Forge, the prices being $11 to $11.50, and $10.50 to $11, Birmingham, respectively. There is still a good demand for Basic, which is quoted around $15.50, Valley furnace. Showing confidence in the future, one inquiry for a 5000-ton per year requirement, covering balance of this year, and for 1909 is significant. It is reported that the Woodward Iron Company, Birmingham, will put one of its stacks on Basic soon. Southern Basic is quotable on a basis of about $11.50 to $12, at furnace, although it is understood that one interest is holding for $12.50. A southern Ohio Steel maker has purchased 6000 tons, July to December delivery, and a number of other Steel makers in central territory have closed for good sized tonnages. Many of the local foundries have bought Iron, but save the several who bought speculatively last week the contracts are for comparatively small lots. Northern Irons remain unchanged. While the asked price is $15.50 to $16, Hanging Rock furnace, it is persistently reported that one interest has sold some big blocks at $15. Ohio Silveries are firm, at $18.50 for 8 per cent., at furnace. Southern Silvery can be bought at about $1 above No. 1 Foundry for 4 to 5 per cent., and $1.50 advance for the 5 to 6 per cent. grades. For early delivery and for the balance of the year we quote f.o.b. Cincinnati, as follows, freight rates being $3.25 from Birmingham, and $1.20 from the Hanging Rock District:

Southern Coke, No. 1	$15.75 to $16.25
Southern Coke, No. 2	15.25 to 15.75
Southern Coke, No. 3	14.75 to 15.25
Southern Coke, No. 4	14.25 to 14.75
Southern Coke, No. 1 Soft	15.75 to 16.25
Southern Coke, No. 2 Soft	15.25 to 15.75
Southern Coke, Gray Forge	13.75 to 14.25
Ohio Silvery, 8 per cent. Silicon	19.70
Lake Superior Coke, No. 1	17.20 to 17.70
Lake Superior Coke, No. 2	16.70 to 17.20
Lake Superior Coke, No. 3	16.20 to 16.70
Standard Southern Car Wheel	22.25 to 22.75
Lake Superior Car Wheel	22.00 to 22.50

(*By Mail.*)

Coke.—In sympathy with the improved tone of the Pig Iron market, Coke is stronger, and there is inquiry for Furnace grades. Some sales of fair size of Wise County Coke are reported for the last half. Sellers appear reluctant to quote for this delivery, but affirm positively that there will be no more cheap Coke. It is reported here that all the cold Frick ovens in the Connellsville field are to be lighted at once; about 60 per cent. have been out. Of spot Foundry Coke, choice brands are quotable at $2.10 to $2.25; on contract for balance of the year, $2.20 to $2.50, at oven. For nearby shipment there have been some fairly good sales of Foundry grades. The record for the first five months in this market shows about 40 per cent. of the 1907 sales. No change is reported in New River prices. One agency made a shipment last week of 7500 tons of Furnace Coke; another order of the same grade to-day is for 25 cars.

Finished Iron and Steel.—Little improvement is shown in Finished products. A few inquiries of the week are for Structural Iron and Steel, principally from the South. Some fairly good sales of Steel Bars for concrete construction are being booked. Generally speaking, it is dull, and dealers look for little improvement for 30 to 60 days. Business in this territory for the five months ending May 30 totals about 50 per cent. of the volume for the same period of 1907. Orders from stock are filled at the following prices, which are f.o.b. Cincinnati: Iron Bars, carload lots, 1.65c., base, with half extras; small lots from store, 1.85c., base, half extras. Steel Plates, carload lots, 1.75c., base, half extras; small lots from store, 1.85c., base, half extras. Base Angles, carload lots, 1.85c., base; small lots from store, 2.10c. Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c. Plates, ¼in. and heavier, carload lots, 1.85c.; small lots from store, 2c. Blue Annealed Sheets (Heavy), No. 16, carload lots, 2.15c.; small lots from store, 2.50c. No. 14, carload lots, 2.05c.; small lots from store, 2.40c. No. 10 and heavier, carload lots, 1.95c.; small lots from store, 2.20c. No. 12, carload lots, 2c.; small lots from store, 2.30c. Sheets (Light), Black, No. 28, carload lots, 2.65c. Galvanized Sheets, No. 28, carload lots, 3.70c. Steel Tire, 4-in. and heavier, carload lots, 1.95c. Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.20c.

Old Materials.—The domestic Scrap market shows no improvement, but some sales have been made for export. One dealer last week shipped 2000 tons of Melting Steel Scrap to New Orleans, where it was loaded in two steamers destined for Italy. Another shipment will go out this week, making 3000 tons in two weeks from this market. The price is withheld, but it is understood to have been at the prevailing price quoted for this market. The largest dealers have immense stocks of all grades. Cast Scrap is very dull. An advance of about 25c. a ton is asked by dealers over quoted prices on some material, but in the main Scrap is purchaseable at the following figures, which are f.o.b. Cincinnati:

No. 1 Railroad Wrought, net ton	$10.50 to $11.50
Cast Borings, net ton	4.00 to 5.00
Heavy Melting Steel Scrap	11.00 to 12.00
Steel Turnings, net ton	5.00 to 6.00
No. 1 Cast Scrap, net ton	10.25 to 11.25
Burnt Cast and Wrought, net ton	8.00 to 9.00
Old Iron Axles, net ton	14.50 to 15.50
Old Iron Rails, gross ton	13.00 to 14.00
Old Steel Rails, long, gross ton	11.00 to 12.00
Old Steel Rails, short, gross ton	11.00 to 12.00
Relaying Rails, 56 lb. and up, gross ton	22.00 to 23.00
Old Car Wheels, gross ton	12.00 to 13.00
Low Phosphorus Scrap, gross ton	13.00 to. 14 00

Metal Market.

NEW YORK, June 3, 1908.

Pig Tin.—Prices, while considerably unsettled, did not fluctuate widely, but there was only a little business. Consumers in the city took some Tin. The holiday of course is blamed for some of the falling off in business. Prices have moved slowly, as follows:

	Cents.
May 27	28.45 to 28.50
May 28	28.25 to 28.30
May 29	28.60 to 28.70
June 1	28.20 to 28.25
June 2	28.60 to 28.70
June 3	28.85

The advance to-day was the result of higher prices in London, which market closed at £130 10s. for spot and £129 17s. 6d. for futures. The arrivals so far this month are 410 tons, and there are afloat for American ports 2422 tons. The statistics of Tin compiled by C. Mayer, show that visible supplies at the end of May were 15,424 tons, the largest since January, 1905, and with that exception since March, 1904. Deliveries into consumption in May were large, 4000 tons, but the total deliveries for the first five months of 1908 show a falling off of 2550 tons compared with last year. Stocks in this country are still low, amounting to 1166 tons. The visible supply at the end of May this year is 3400 tons larger than at the end of May last year.

Copper.—Buying is small, domestic and foreign consumers alike holding off. Perhaps rather more inquiry is noted, especially from consumers in New England, but that section of the country seems to be the center of good news this week. Of course some business is constantly being done, and the ruling prices are 13c. for Lake and 12.62½c. to 12.75c. for Electrolytic. As usual, rumors are abundant of large sales at higher prices, but are not received with much faith. The one encouraging factor in this trade is the ability of manufacturers of finished lines to get a considerable increase in business by shading prices. Already Brass Sheets and Tubes are moving more freely and the same can be said of Copper Sheets. The London market is firmer than last week at £57 17s. 6d. for spot and £58 7s. 6d. for futures. The exports from Atlantic ports in May were 22,600 tons, making the total so far this year 133,800 tons, compared with 66,000 tons in the same months last year. The importation of Copper in April, complete figures for which are now available, amounted to 7300 tons, a falling off of 4000 tons compared with the corresponding month last year. The imports during the first four months of 1908 amounted to 29,600 tons, contrasted with 44,440 tons during the same months in 1907. The exports of Copper on this

movement since October 1, 1907, amount to 234,800 tons. In the year of maximum exports, 1904, the total outgo was about 248,000 tons. The report of the Amalgamated Copper Company, issued this week, states that the companies owned wholly or in part produced in 1907 about 212,000,000 lb. of Copper, of which the parent company received the benefit from about 178,000,000 lb. The same items in 1906 were 275,000,000 lb. and 224,000,000 lb., respectively.

Waterbury Average.—The Waterbury average for May was 13c.

Pig Lead.—The advance noted last week was evidently too rapid, as outside sellers are now shading the price to 4.30c., New York. The demand is not so good as a month ago, at least from the principal sellers. This indicates that what business there is is taken by outside holders. The St. Louis market is dull, at 4.20c. It would be a simple matter to take foreign Ore out of bond should prices go higher. Soft Spanish Lead is quoted at £13 5s. in London to-day.

Nickel.—Prices are unchanged at 45c. for ton lots and 50c. to 60c. for smaller quantities.

Spelter.—Prices of Spelter continue unchanged at 4.40c. to 4.45c., St. Louis, and 4.55c. to 4.60c., New York. On the present cost of Ore there is no money in Spelter at these prices.

Antimony.—Prices continue nominal, and the market is dull. Cookson's can be imported at 8.50c.; Hallett's at 8.50c. to 8.62½c. and outside brands at 8.25c.

Tin Plates.—Orders for prompt shipment continue to come in freely, but there is no disposition among consumers to stock up. Prices are without change, at $3.89 New York and $3.70 Pittsburgh, for 100-lb. IC Coke Plates. In Swansea Welsh Plates are unchanged, at 12s. 3d.

Old Metals.—Little change is observed in prices, some being advanced and others lowered, the reason being that more business is going on, and it is possible to quote prices with more accuracy than recently. Consumers are buying more freely to cover actual wants. Frequently of late orders have been received for prompt shipment which confirms again, if such confirmation be necessary, that stocks of raw materials in consumers' hands are almost insignificant. Some speculative buying is likewise making itself felt. Dealers' selling prices are as follows:

	Cents.
Copper, Heavy and Crucible	12.00 to 12.25
Copper, Heavy and Wire	11.75 to 12.00
Copper, Light and Bottoms	10.75 to 11.00
Brass, Heavy	9.00 to 9.25
Brass, Light	7.00 to 7.50
Heavy Machine Composition	11.50 to 11.75
Clean Brass Turnings	7.50 to 8.50
Composition Turnings	9.50 to 10.00
Lead, Heavy	4.00
Lead, Tea	3.65
Zinc	3.50

New York.

NEW YORK, June 3, 1908.

Pig Iron.—The volume of business has fallen off somewhat and the buying movement seems to be again drawing to a close. There has been quite a number of round lots sold and there are still pending negotiations for some important lots, which will determine whether buyers may be found to pay the higher prices demanded by many of the furnace interests. We quote, at tidewater: Northern No. 1 Foundry, $16.75 to $17; No. 2 Foundry, $16 to $16.50, and No. 2 Plain, $15.50 to $16. Alabama Irons are selling at $16.50 to $17 for No. 1, and $15.75 to $16.25 for No. 2 Foundry.

Steel Rails.—The 42,000-ton sale of Open Hearth Rails to the Illinois Central Railroad, to which widespread reference has been made in the past week, is an old order for 1908 delivery, reported last year, the business being taken by the Tennessee Company. The odd 2000 tons represents the usual 5 per cent. of seconds. The original award of the Illinois Central included also 10,000 tons of Bessemer Rails, placed with the Illinois Steel Company. It is noticed lately that as various railroads, principally smaller lines, which placed Rail orders last year, succeed in making their financial arrangements, they become urgent at once about deliveries, and the mills have been asked to expedite these in several cases.

Structural Material.—The effect of the reduction in the price of Steel Bars on the Structural market is a matter of immediate interest to the fabricating companies. Particularly is this true in view of the fact that contracts for fabrication and erection have been taken lately on a basis that corresponds to a very considerably less price than 1.60c. for Structural shapes. In one recent case where a steel company bid for a Structural contract a 2.10c. price for fabricated material was named, which would represent about 1.25c. for Steel. The belief is that the placing of construction work will be delayed by the Bar reduction, and the expectation of buyers of Shapes that a readjustment will be made there also is now expressed with more confidence. The leading fabricating company, basing its bids on the price of Steel that has been maintained by the leading interests, still books a relatively small fraction of current business—this in the face of the fact that the amount of work figured on in New York City in May was several thousand tons more than in May, 1907. Among business likely to be let in the next few days is the Astor House addition, amounting to about 4000 tons. The Sinclair Realty Company will let the contract soon for the building at Broadway and Eighth street, on the site of the old Sinclair Hotel. About 1000 tons will be needed. Another job coming up soon is the new Farmers' Loan & Trust Company Building on William street, calling for 3000 to 4000 tons. In May, the American Bridge Company booked 21,000 tons, while its average for the first five months of the year was 17,000 tons. We quote on tidewater deliveries, shipments from mill, as follows: Beams, Channels, Angles and Zees, 1.86c.; Tees, 1.91c.. On Beams, 18 to 24 in., and Angles over 6 in., the extra is 0.10c. Material cut to length is sold from stock at 2¼c. to 2½c.

Bars.—The past few days have been quite notable in this branch of trade. A heavy increase occurred in orders placed for Bar Iron, and leading Eastern mills are understood to have secured a number of large orders. The business was taken at some sacrifice of prices, and quotations are now 1.35c. to 1.40c., New York. The Eastern manufacturers are still at work on a plan which they are undertaking for the purpose of getting the market in better shape. Numerous inquiries are in hand, and a continuance of the buying movement appears probable. Prices of Steel Bars were reduced on Monday to 1.40c., Pittsburgh, or 1.56c., New York.

Plates.—No improvement is reported in this line. Some orders are being taken for Universal Plates, but the demand for Sheared Plates is exceedingly light. Prices of standard sizes of Plates are maintained, as follows, at tidewater: Sheared Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—Proposals for the Syracuse contract for 20,000 tons of 30 to 42 in. Pipe were opened on Monday, and the leading interest was the lowest bidder, at $23 per net ton, delivered. The same company was the lowest bidder on 350 tons of 6, 12 and 24 in. Pipe, on which bids were opened by Yonkers, also on Monday, at $25.60 per gross ton, delivered. The city of New York will open bids for 3500 tons of 12, 16 and 20 in. Pipe for Staten Island, June 10. On the same day the city of Rome, N. Y., will open bids on 3745 tons of 30-in. Pipe. The demand for carload lots and slightly larger quantities is improving, and prospects are encouraging for a continuance of what now appears to be a seasonable demand. Although the prices named on large lots are still quite low, manufacturers are advancing their figures on carload lots, and $24 per net ton, at tidewater, is probably the inside price for such quantities of 6-in.

Old Material.—The market is steadily becoming more active. Within the week sales have been made of Heavy Steel Melting Scrap which total at least 10,000 tons. Foundries are taking more Cast Scrap and prices of this class of Old Material are stronger. Rolling mill stock has been quiet, but it is expected that the increased buying of Bar Iron will shortly compel some of the Bar Iron manufacturers to make purchases of Old Material to cover the contracts taken. Relaying Rails are in continued good demand and prices show firmness. Old Car Wheels are inactive, with abundant stocks in dealers' hands. Quotations are about as follows per gross ton, New York City:

Old Girder and T Rails for melting	$11.50 to $12.00
Heavy Melting Steel Scrap	11.50 to 12.00
Old Steel Rails, rerolling lengths	11.50 to 12.00
Relaying Rails	20.50 to 21.50
Old Iron Rails	14.50 to 15.00
Standard Hammered Iron Car Axles	16.00 to 16.50
Old Steel Car Axles	14.50 to 15.00
No. 1 Railroad Wrought	12.00 to 12.50
Iron Track Scrap	10.00 to 10.50
No. 1 Yard Wrought, long	11.00 to 11.50
No. 1 Yard Wrought, short	10.00 to 10.50
Light Iron	5.50 to 6.00
Cast Borings	5.00 to 5.50
Wrought Turnings	6.50 to 7.00
Wrought Pipe	9.50 to 10.00
Old Car Wheels	12.00 to 13.00
No. 1 Heavy Cast, broken up	13.00 to 14.00
Stove Plate	9.50 to 10.50
Locomotive Grate Bars	10.50 to 11.00
Malleable Cast	11.50 to 12.50

Ferroalloys.—Business has not continued so active as last week; still trade has been fair. Sales of 50 per cent. Ferrosilicon were made at $70, Pittsburgh. Prices on Ferromanganese are 50c. per ton easier, at $44, Baltimore. Same sellers, however, are holding out for $46.

Iron and Industrial Stocks.

NEW YORK, June 3, 1908.

A reversal of sentiment has characterized the stock market and prices have shown a marked advance since our last report. The lowest prices of the intervening period were realized on Thursday and Friday. The improved feeling is ascribed partly to the passage of the Emergency Currency

bill by Congress. The range of prices on active iron and steel stocks from Thursday of last week to Tuesday of this week was as follows: United States Steel common 35⅞ to 39⅛, preferred 100⅛ to 103; Car & Foundry common 35¼ to 38, preferred 98; Locomotive common 48 to 51½; Steel Foundries common 6½, preferred 34; Cambria Steel 30¼ to 31⅜; Colorado Fuel 25⅛ to 29⅛; Crucible Steel common 5⅞ to 6⅛, preferred 40¼ to 42¾; Pressed Steel common 28 to 29⅛, preferred 82; Railway Spring common 37 to 38¾, preferred 91; Republic common 17¼ to 19¾, preferred 66¾ to 71½; Sloss-Sheffield common 49¾ to 53; Cast Iron Pipe common 27⅛ to 27½; Can preferred 54 to 55⅝. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 38¼, preferred 102¼; Car & Foundry common 35¾, preferred 98; Locomotive common 50½; Colorado Fuel 27¾; Pressed Steel common 28⅝, preferred 82; Railway Spring common 37¼; Republic common 18⅞, preferred 70; Sloss-Sheffield common 51¼; Cast Iron Pipe common 27½, preferred 75¼; Can preferred 56.

Dividends.—The American Can Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable July 1.

The American Car & Foundry Company has declared a quarterly dividend of 1¾ per cent. on preferred stock, and ½ per cent. on the common stock, both payable July 1.

An International Congress of Refrigerating Industries.

The announcement is made of the first International Congress of the Refrigerating Industries, to be held in Paris, France, September 17 to 23, 1908, under the patronage of the French Ministers of Agriculture, Commerce and Industries. The French committee has invited other countries to participate. The United States Government has accepted the invitation, and delegates will be appointed by the Secretary of State and the Secretary of Agriculture to represent this Government. An American committee has been formed in part, having the following officers: President, Homer McDaniel, Cleveland, Ohio; vice-president, John E. Starr, 258 Broadway, New York; treasurer, John S. Field, Chicago, Ill.; secretary, J. F. Nickerson, 315 Dearborn street, Chicago, Ill. The purpose of the congress is to bring together the leading experts and representatives of the various industries and enterprises in all countries in which refrigeration is used for facilitating the preservation and transportation of food products. The congress is divided into six sections, as follows: Section 1, Low Temperatures and Their General Effects; Section 2, Refrigerating Appliances; Section 3, The Application of Refrigeration to Food; Section 4, The Application of Refrigeration to Other Industries; Section 5, The Application of Refrigeration in Commerce and Transportation; Section 6, Legislation.

One of the topics to be considered by Section 4 is "Air Drying at Blast Furnaces," this coming under the general title, "Mines and Metallurgy, Public Works, Stearine, Paraffin, Margarine, &c." This section will also consider in general new industrial applications of refrigeration. Arrangements have been made for a documentary exhibit and a display of plans, models and small appliances. American manufacturers are invited to send exhibits. Of these, particulars may be obtained from the secretary of the American committee.

The Niles Iron & Steel Company, Niles, Ohio, will enlarge its plant by the erection of two additional two-story brick buildings. One of these will be used for a machine shop and the other for manufacturing purposes. The company will add to its present products, the manufacture of eaves trough and conductor pipe and pressed steel seats and other pieces for agricultural implements. A new engine will also be installed.

The Passaic Steel Company's property is to be sold. The United States Court at Trenton, N. J., May 28, decided that it must be sold subject to the holdings of the first mortgage bondholders. It is also held that the mortgage may be foreclosed, with the receivers as party defendants to the proceedings to protect the interests of the general creditors. The first mortgage bonds, all issued, aggregate $2,500,000.

The Production of Aluminum in 1906.

The consumption of aluminum in the United States in 1901 amounted to 17,211,000 lb., as compared with 14,910,000 lb. in 1906, according to the forthcoming annual report of the United States Geological Survey, compiled by W. C. Phalen. Aluminum shared in the greatly increased demand, along with the other metals, in the first nine months of the year 1907, and the rise in the price of copper and tin no doubt served to widen the field of application of aluminum. Contrary to the general expectation and to numerous prophecies, the great increase in the domestic production did not materialize. This is to be accounted for to a certain extent, but probably not to the extent that is generally supposed, by the great falling off in the demand toward the close of the year, owing to the general business depression. In no branch of the aluminum industry has the influence of the general depression been felt more than in the manufacture of electric railroad cars and motor cars. The absolute increase in quantity of metal produced was less in 1907 than in either 1905 or 1906, and the percentage of increase was only about half that of 1905 and 1906. The following table gives the production in the past five years:

Years.	Pounds.	Years.	Pounds.
1903	7,500,000	1906	14,910,000
1904	8,600,000	1907	17,211,000
1905	11,347,000		

The figures for 1904 to 1907, inclusive, represent consumption.

New Industrial Developments.

In August, 1888, the Pittsburgh Reduction Company, now the Aluminum Company of America, was organized, and a factory in which to manufacture the metal was started in Pittsburgh in November of that year. In 1890 the works were greatly enlarged, and in the following year they were removed to New Kensington, a suburb of Pittsburgh, and in 1893 were again enlarged. In 1896 the production of pig aluminum at New Kensington was abandoned, since which time the works have been devoted to the manufacture of pig aluminum into more or less finished forms. Other works now operated by the company are located at Niagara Falls and Massena, St. Lawrence County, N. Y., and at Shawinigan Falls, Quebec, Canada, also at East St. Louis, Ill. During 1907 the capacity of the chemical plant at East St. Louis was greatly enlarged. The material from the Arkansas mines is washed and treated to free it from iron, silica, titanium, &c., at the East St. Louis plant.

At New Kensington the company has installed a continuous mill for rolling aluminum sheets, the only one of its kind in existence. A new rolling mill has also been in course of construction at Niagara Falls, which will be one of the largest and most complete sheet rolling mills in America. At Massena, the company has purchased the entire plant of the St. Lawrence Power Company with its canal and powerhouse of 40,000 hp. capacity, and is preparing to dredge out the canal to double this capacity. A new powerhouse for this enlarged capacity was started in 1907, and eight large waterwheels to absorb the capacity of the first canal have been purchased for installation in the old powerhouse. The plans referred to in the Survey's report for the year 1906 as being formulated for extensive water power development and aluminum works on the Cumberland River near Corbin, Ky., have so far as known not yet materialized. Twenty thousand horsepower, according to the plan proposed, will first be developed, and most of this is to be used in the works.

The Thomas Carlin's Sons Company, 1600 River avenue, N. S., Pittsburgh, has received an order from the Monongahela River Consolidated Coal & Coke Company, Pittsburgh, for a 6 x 8 in. four drum hoisting engine. The company is building a No. 18 shear to cut 2¼ in. square soft steel cold and one No. 40 to cut 1¼ in. material, for shipment to Baltimore, Md.

The Bethlehem Steel Company, South Bethlehem, Pa., rolled 30-in. beams successfully on its Grey structural mill Tuesday and Wednesday.

The Machinery Trade.

NEW YORK, June 3, 1908.

The demand for machinery since the first of the year has been so light and irregular that a few additional sales in a week often increased the business of a company to an extent that afforded considerable encouragement, which would be offset by a decrease of trade the following week. The demand has fluctuated within such a narrow limit and so frequently as to indicate that confidence has not been fully restored. With some houses the totals of business for May were a little larger than those for the previous month, but others report a slight decrease. The increase with many was due to the orders received the last week of the month, and they feel somewhat encouraged as during the first few days of June this was maintained. There is undoubtedly a better feeling among machinery houses and, taken as a whole, the trade shows some improvement. Business continues to consist of single tool orders from the small industrial plants, neither the larger works nor the railroads having come into the market as yet. It is hoped that the recent financing by some of the important railroads will result in the early purchases of mechanical equipment.

It is reliably stated in machinery circles that a number of large railroads will begin some extensive purchasing about July 1. Several machinery men who follow the railroads closely have been in receipt of inquiries in the past few weeks on which they have bid and heard nothing further about. In following up these inquiries they were informed that the railroads were not prepared to buy as yet, but of late word has gone out that a buying movement will be started by a number of the more important interests within two months. It is well known in the trade that the railroads in general are short of equipment in the majority of their large repair plants and they all seem to take the same attitude in the situation, which has been that of awaiting the outcome of business conditions. It is now anpounced that the railroad authorities are encouraged over the outlook and they have given orders to prepare specifications for bringing up their various shops to the proper standard. This information comes from a number of machinery and railroad supply men who make it a point to keep well informed as to the railroad situation. The machine tool list recently issued by the Delaware, Lackawanna & Western Railroad is expected to be closed shortly, and orders for the equipment for the new shops of the Idaho & Washington Northern Railroad will likely be placed by Westinghouse, Church, Kerr & Co. within the next few weeks. The Philadelphia & Reading Railroad is reported to be preparing to buy some mechanical equipment.

The Board of Governors of the Machinery Club, at a meeting held on Tuesday, June 2, re-elected F. H. Stillman as president for the ensuing year. R. C. McKinney was made vice-president, and Walter L. Pierce resigned as treasurer and was succeeded by Charles A. Schieren, Jr. According to the new by-laws of the organization Mr. Schieren will be *ex-officio* member of the House Committee. Directly succeeding the meeting President Stillman announced that he would reappoint all the committees that have worked during the formation of the club.

Mining machinery men, who have been doing an unusually good business in Mexico during the last few months, are congratulating themselves on the fact that the Mexican Congress has for another year extended the exemption of mining and smelting machinery from import duty. There was a lull in the inquiries for a time, because of the fact that the Mexican Congress had the matter under consideration and mine operators were not certain as to what action would be taken. The exemption of mining and smelting machinery from taxation will include power apparatus designed for that purpose and in consequence manufacturers in that line will be materially benefitted, or, rather, will continue doing a thriving business in the mining equipment end of their trade. It is stated in the trade that Mexican representatives have advised that mine operators will undoubtedly extend their activities during the year and many of them have planned extensive operations. Because of the fact that the exemption was only extended one year, many operators and mining machinery men think that it is highly probable that next year the Mexican Government will take steps to impose duties on machinery shipped from this country. In this connection it is said in the trade that the Juanuato Development Company, which intends to spend about $4,000,000 for machinery equipment to develop mining properties in Mexico, will shortly come into the market with its inquiries, as it is understood that this company was watching with considerable interest the action of Congress. The company is one of the subsidiary interests of the Securities Corporation, Ltd., 40 Wall street, New York, and it has been one of the largest purchasers of mining machinery in Mexico. It controls a number of large mining properties in the vicinity of Juanuato and is now building an extensive railroad system connecting its properties. Its plans include the erection of a 1000-stamp mill at La Luz at a cost of $2,000,000, and an equal amount will be spent on general mining equipment, such as power drilling machinery, conveying equipment and the like.

The New York Central Railroad is making a number of improvements at its various shops which will necessitate the installation of considerable new machinery. We understand from a reliable source that the road has for some time been buying in small lots, the aggregate amounting to a considerable sum of money. Some small purchases were made the past week and additional machinery has been decided upon, the orders for which are expected to be sent out in the near future.

Bids are now in the trade covering some of the equipment which will be needed for the plant of the Cramp Dry Dock Company to be erected at Norfolk, Va., by Joseph Stewart & Co., 135 Broadway, New York, but we are informed that they are only of a preliminary nature and were sent out with a view to ascertaining the probable cost of some of the equipment that might be needed. As has been stated in these columns, the plant will cost about $500,000 and will include a fair sized machine shop. The bids now out include equipment for the two marine railways it is proposed to erect and some other outdoor equipment. The machine shop end has not been reached, and it is thought that no inquiries will be sent out for that line of equipment until the plans are passed upon by the Cramp Dry Dock Company's engineers.

The Fuller Engineering Company, Allentown, Pa., has been awarded contract for the designing and construction of a 7000-bbl. Portland cement plant for the Seaboard Portland Cement Company, to be erected near Alsen, N. Y.

The Board of Water Supply of New York has decided to throw out all bids received for the construction of the Wallkill siphon and to advertise the work again, or possibly change the plans and do the work itself.

The State Canal Board has approved two new plans for work on the Erie Barge Canal, involving an expenditure of about $2,000,000. One contract covers work near Medina, at a cost of about $1,200,000, and the other for modifying dams and for general construction in the Mohawk River at Little Falls, at a cost of about $800,000.

The Finance Committee of the Board of Freeholders, Newark, N. J., is understood to have appropriated $10,000 for enlarging the electric light and power plant in the penitentiary, the equipment to consist of a 150-hp. boiler, 80-hp. engine and generator. An appropriation of $26,500 for installing a new electric light plant in the Court House was deferred for later action.

Bids were opened June 2 for the construction of the Rondout syphon section of the Catskill Aqueduct, the lowest bid being that of S. Pearson & Sons, who were also the lowest bidder for the Wallkill siphon two weeks ago, and whose bid was thrown out as being too low. The tunnel is to be 4½ miles long, and the estimated cost of the work is $5,314,000.

A number of foreign consular representatives accepted an invitation to visit the offices of the C. I. F. Company, 11 Broadway, New York, on Thursday, May 28, when the system of that company for handling and filling export inquiries was explained to them by A. M. Fisher, president of the company, and other representatives of the organization. The initials in the name of the company mean cost, insurance and freight, and it means that the seller furnishes the goods, paying the cost, freight and insurance to the point of delivery. Representatives of the company explained to the visitors its system of handling the export problem and demonstrated the results of the excellent plan which has been designed for that purpose.

Chicago Machinery Market.

CHICAGO, ILL., June 2, 1908.

The final summing up of results for the month of May will, it is believed, not prove disappointing as compared with previous months of the present year. It seems highly probable that in most machinery lines a gain—not large, but still a gain—will be recorded, and even if it can only be shown that there has been no actual recession, this, under present circumstances, should be gratifying. In considering the general volume of business it should be remembered that among dealers and manufacturers in this territory deriving trade from Western sources largely it has been proportionately larger than in other less favored sections of the country. The machine tool houses are devoting their energies to securing a share of the miscellaneous orders from shops and factories, which are generally limited to indispensable tools. It is observed, however, that the sales departments are extremely vigilant, and every hint suggesting a possible source of business is carefully followed up. Stocks are plentiful and the factories are in position to execute orders promptly, so that when a sale is effected delivery can be made without

the vexatious delays that last year gave rise to so much trouble to both seller and buyer. Machinery salesmen have remarked upon the larger percentage of orders that are now developing from inquiries, the greater number of prospective purchasers seeming to be prompted by actual needs rather than anticipated future requirements. At the same time the vigorous efforts of the salesmen themselves may have something to do with the increased percentage of closures.

A few new plants building here and there and replacements in old plants continue to supply the boiler shops with some new business, but the volume is much too small to keep capacities fully engaged. Some fair sized installations of water tube boilers have recently been made by various manufacturers of this type of equipment, and a number of orders are in prospect. Some of the larger manufacturers of electrical machinery report recent improvement and note the entry of some important orders for such machinery. It may be said in general that the machinery market is without notable change in any direction, but the belief is prevalent that a gradual betterment of conditions may be expected.

The firm of D. O. James, Chicago, manufacturer of cut gears, has been succeeded by the D. O. James Mfg. Company, incorporated with a capital stock of $75,000. The company, which was formerly located at 35 North Canal street, now occupies a well appointed two-story building, 50 x 120 ft., at 351-353 West Monroe street. With increased space and added facilities the company is now able to handle its growing business with greater economy and serve its customers more promptly.

The Citizens Gas Company, Indianapolis, Ind., is preparing to erect during the coming summer a by-product coke oven plant, consisting of 50 ovens, with a capacity of 7½ tons each per day, and will be in the market for coal handling machinery; also for all apparatus and equipment connected with the condensing house and purifying plant of a gas works. Plans for the power plant required for this installation are now in course of preparation. All of the machinery will, as far as possible, be electrically driven, and it is estimated that at least 250 kw. will be required for operating the small machinery about the place. Boilers, engines, generators, &c., have not been specified, but plans in the hands of the engineers will probably be completed in two weeks. Geo. M. Brill, consulting engineer, Marquette Building, Chicago, will have charge of the mechanical equipment, B. J. T. Jeup, Indiana Trust Building, Indianapolis, being the local consulting and construction engineer.

Figures are being taken on three 200-hp. boilers for installation in the Coliseum Building, Chicago. It is probable, however, that nothing will be done in the matter until after the meeting of the Republican National Convention, which will be held in this building. Two 250-hp. boilers will also be required for the Forest Park water power plant, Forest Park, Ill. The Merrimac Portland Cement & Material Company, St. Louis, has purchased a battery of 10 300-hp. water tube boilers.

An electric light and water plant to be constructed at Bruce, Wis., will require a 30-kw. 220-volt direct current dynamo, direct connected to a simple high speed engine; 70-hp. boiler, 2500 ft. of cast iron pipe, steam fire pump and auxiliary equipment. This work is in charge of Oscar Claussen, consulting engineer, St. Paul, Minn.

The Black Hills Traction Company, Spearfish, S. D., is arranging to construct a 1200-hp. hydro-electric plant on Sand Creek, near Beulah, Wyo., about 5 miles above the company's present plant.

The Carrollton Electric Light Company, Carrollton, Miss., whose plant was destroyed by fire some months ago, has made arrangements for its reconstruction, and bids for the machinery and equipment will be taken on June 15. We are advised by W. H. Hafner, Mayor, that plans and specifications are now completed and on file.

The Menominee & Marinette Traction Company, Menominee, Mich., has increased its capital stock to $1,000,000, and is considering the installation of a power house and dam on the Grand Rapids, near Ingalls. Bids will be asked on material as soon as plans and specifications are prepared.

St. Louis Machinery Market.

ST. LOUIS, MO., June 2, 1908.

The metal working machinery interests find a slight improvement manifested over conditions that existed in the spring. Inquiry shows this to be the more marked in case of light machinery, and the demand is mainly from the small shops. There still continues to be considerable call for various kinds of second-hand machinery. In heavy machinery the demand is quite uneven, a week of activity being followed by one in which there is a dearth of orders.

Those lines which depend upon railroad business mainly complain that the situation is still ruling very dull. While outside of the machinery department, yet as an indication of improved conditions, it may be stated that a local company has done more in freight car roofs the past four weeks than in the preceding four months.

Manufacturers of shoe machinery are in a cheerful mood. A local company states that it has been running full since January 1 and is behind on orders. The main difference between the present time and a year ago is merely in the number of unfilled orders.

In woodworking machinery there is more doing, and there is also a good call for threshing machinery. Concerns having business in seasonable agricultural appliances are finding a satisfactory demand.

There is an improved call for elevating and conveying machinery and also for crushing and grinding machinery.

A large local company reports the present month the best for machinery castings experienced this year.

There is a good demand for all classes of electrical appliances and machinery.

Cincinnati Machinery Market.

CINCINNATI, OHIO, June 2, 1908.

In some lines of the machinery trade in this district there is a marked improvement in both inquiry and orders; in others the prevailing lassitude is none the less in evidence. The special machinery lines—the manufacturers of metal working, bakers' machinery, &c.—report encouragingly. The manufacturers of motors and generators and other electric power standards are quite busy. A better feeling prevails throughout the tool manufacturing district because of the firmer tone of the iron markets, and a number of plants are being overhauled by their owners and preparations made for an expected early resumption of operations on an enlarged scale. Mails of those that were caught with a large stock of tools lead to the hope that the unloading movement is a feature of the comparatively near future.

A number of Cincinnati machine tool builders will exhibit at the Atlantic City convention of the Railway Master Mechanics and Master Car Builders, which opens on June 17 for six days. For the display, which is to be elaborately quartered on the new Young's Pier, the Cincinnati Milling Machine Company will ship two of its latest machines, representing both the vertical and horizontal types. J. L. Bishop of the company's technical department will have charge of the exhibit. Mr. Gingrich will doubtless spend a few days there during the convention, as will also President F. A. Geier and Secretary-Treasurer Wood Walter. The Cincinnati Machine Tool Company will send two machines, a 20 and a 24 in. upright drill, and August H. Tuechter and Sherman C. Schauer will both be in attendance. The Bickford Drill & Tool Company will have on exhibition one of its new type full universal radial drills, 5-ft. size, motor driven. H. M. Norris, manager of the works, will have charge, and Mr. Bieler, an official, will also put in as much of his time there as he can consistently. The Lodge & Shipley Machine Tool Company will place on exhibition in the combined section a 24 in. by 12 ft. patent head engine lathe, motor driven, and will make a special exhibit of a double end axle lathe and a 16-in. engine lathe with Derrer universal shaper attachment. R. G. English, mechanical engineer and office salesman, will have charge of the exhibit. R. D. Betts, office manager, will put in some time there also. The Triumph Electric Company will exhibit some of its latest types of machinery.

All local manufacturers of medium and smaller sized units in electric power developing machinery note improved conditions. The Triumph Electric Company has orders for two carloads of all sizes of induction motors, from the smallest size manufactured to 65 hp., and two carloads of direct current, all for St. Paul, Minn., shipment during the next three months.

The I. & E. Greenwald Company has given to the Provident Savings Bank & Trust Company a mortgage securing a new bond issue of $100,000 to cover contemplated improvements to the plant at Pearl street and Eggleston avenue, which occupies 100 x 254 ft. The company is one of the oldest manufacturers of engines and accessories in this section.

The Desmond-Stephan Company, Urbana, Ohio, has purchased what is known as the Mosgrove property, at the corner of South Main and West Water streets, adjoining its works, and it is reported will in a short time build an addition to its plant. The consideration is said to have been in the neighborhood of $6000.

In order to make extensive repairs the Dover Mfg. Company, Canal Dover, Ohio, maker of sad irons, has closed down its plant for a few weeks.

It is reported that the Marion Steam Shovel Company, Marion, Ohio, has decided to make its own steel and that plans are now being prepared for the erection of an addition to the plant about 80 x 300 ft. The most modern steel making furnaces and machinery will be installed. The company notes an improvement in business and is gradually taking on additional men.

The Dayton Globe Iron Works Company, Dayton, Ohio, has had sufficient contracts on hand to keep its plant in operation at practically normal capacity for several months. The two new units for which it has been awarded contract

by the Winchester & Washington City Railroad, Winchester, Va., consist each of a pair of 49-in. turbines, mounted horizontally and inclosed in a steel flume 12 ft. 6 in. in diameter, which will connect to the thimble now built in the bulkhead wall. Each pair of wheels will develop 1000 hp. and the power will be transmitted to the generators above through a rope drive of the American continuous type, to be designed and built by the Dodge Mfg. Company, Mishawaka, Ind. The generators will be of the alternating type and furnished by the Westinghouse Electric & Mfg. Company, Pittsburgh.

An encouraging increase in business is noted by President Loeb of the Ohio Metal Company, Columbus, Ohio, who looks for an early resumption of business on a nearly normal scale.

The American Brass & Specialty Company, recently incorporated in Columbus, Ohio, will take over the Auto Brass Company, manufacturer of brass parts for automobiles. The plant of the new company will be located in East Gay street. The officers are Frank R. Maine, president; George F. Hill, vice-president; Willis F. Houser, secretary-treasurer, and Louis G. Parrott, general manager. The officers named, together with Clarence Osborne, constitute the Board of Directors.

Reports from Columbus, Ohio, indicate that the American Cash Register Company is employing a full complement of hands and working every department full time. It is claimed that the factory is behind almost 500 orders, and because of this and the bright outlook for the future an enlargement of the plant is contemplated.

The Reliance Engineering Company, Cincinnati, has the contract for building the new water works plant at Newton Falls, Ohio, which is to cost about $25,000, and bids are expected to close about June 15 for 300 tons of pipe and other equipment. A steel stand pipe, with a capacity of 100,000 gal., will be erected. The main building will be 35 x 60 ft. and the pumps will be electrically driven.

Cleveland Machinery Market.

CLEVELAND, OHIO, June 2, 1908.

If any improvement has appeared in the local machine tool market during the past week it is very slight. While the volume of orders remains nearly stationary, a few of the dealers notice some increase in inquiries, and the general opinion of the trade is that the outlook is better. While some of the dealers report no increase in their May sales as compared with April, the majority did a little more business last month than during the previous month.

Dealers are looking for a fair volume of business from the automobile builders during the next few months. It is understood that several of the automobile plants in this city and other Ohio points and in Detroit will need some tools before beginning work on their 1909 output, and during the past week one concern, the Dayton Motor Car Company, placed an order for 12 machine tools, six of which were milling machines.

The interest of the week was centered in the bids that were received by the Cleveland Board of Education June 1 for machine shop and woodworking tools for the new Technical High School. Competition was very strong among builders and dealers, and it is expected that the successful bidders will get the orders at a small margin of profit. These requirements attracted so much attention that the 20 typewritten copies of the list and specifications were soon exhausted, and the large number of inquiries for the specifications led the Board of Education to have the list printed for distribution.

Sales for the most part are still limited to single tools, orders for more than two or three tools being very rare. The new inquiries that are coming in are all limited in size, there seldom being one for over three or four tools.

Second-hand tools are in fairly good demand, the market showing an improvement in this regard, and dealers are quickly disposing of good used tools that they have picked up during the past few weeks.

Some builders of machine tools report a slight improvement in orders and have been able to add to the working forces in their plants. Others, however, notice no change in the demand. Builders of transmission machinery report orders slightly better and a fair increase in the volume of inquiries. There is some improvement in the demand for industrial cars from industrial plants and other users. Some orders are coming from Western mines, but the demand from Mexican mining companies, which was fairly good early in the spring, has fallen off. Makers of steam specialties report a satisfactory increase in their volume of orders. Conditions in most manufacturing lines, outside of machine tools, show a little improvement. Plants that make automobile parts are fairly busy.

The Atlas Car & Mfg. Company, Cleveland, has recently taken two large orders for industrial railways, one for a foundry and the other for a large electrical plant. The orders include tracks, motor cars and other equipment. One order includes 56 cars and the other 30 cars. This company is now building 10 electric coke quenching cars on an order from a leading coke producer. The cars are of 30 tons capacity and equipped with air compressors and two 50-hp. motors. The company is also building 12 air dumping cars for a Canadian mining company, the doors of the cars being opened and closed by the engineer. The company is also getting a fair volume of orders from Western mines and industrial plants.

The Davis Clutch Company, Cleveland, has been incorporated, with a capital stock of $15,000, to manufacture an improved friction clutch. The officers are G. O. Groll, president; C. E. Monck, vice-president and general manager; A. G. Doherty, secretary, and C. L. Howells, treasurer. The company has opened temporary quarters in the Sigler Power Block on East Third street.

The plant of the Lane Tool Company, Cleveland, which was recently purchased by the Massillon Foundry & Machine Company, Massillon, has been moved to the latter city and installed in an addition erected for that purpose by the purchaser. The Massillon Company will commence the manufacture of forge and drop hammers within the next few weeks. After the plant is placed in operation the company will probably be in the market for a few machine tools, including a radial drill and a cylinder boring machine.

The Peerless Motor Car Company, Cleveland, will soon begin the erection of a two-story addition to its plant, of brick, steel and concrete construction, 106 x 144 ft. The building will be used for the erecting department. No machinery will be required for this building, but the company will add a number of tools to its machine shop equipment, having already placed an order for some tools in its preparation to build its 1909 machines.

The Wire Goods Company, Worcester, Mass., recently established a branch plant in Cleveland, at 1144 West Third street, for the manufacture of kitchen wire goods and some of its other articles. The company reports that the volume of its orders has continued very satisfactory during the past few months and that the outlook for the balance of the year is good.

The Central Foundry Supply Company, Columbus, Ohio, has been incorporated, with a capital stock of $20,000, by John S. Ball, Dwight R. Mason, Lena B. Whiton, Ella M. Mason and Elizabeth P. Fenton.

At the annual meeting of the Capitol Lock-Nut & Washer Company, Columbus, Ohio, held recently, the Board of Directors was reduced from nine to seven, and the following were elected: J. F. Dickson, A. M. Gaines, H. B. Hutchinson, Frank B. Hubbard and W. E. Meade of Columbus, A. M. Foster of Cleveland and O. E. Foster of Buffalo. The officers elected were J. F. Dickson, president; A. M. Gaines, vice-president and general manager, and William Singleton, secretary and treasurer.

New England Machinery Market.

WORCESTER, MASS., June 2, 1908.

Nothing has occurred to check the impression that conditions are strengthening in general business in New England. The volume of orders is somewhat greater, though in the machine tool market the increase is not sufficient to be considered important in actual figures. To most observers the outlook seems better than it has for some time, and the hope is that a further stiffening of sentiment will bring substantial returns in the near future, probably in the autumn. There are those who look for a sudden accession of strong demand. But the usual belief is that the return to prosperity will be gradual and consequently healthful. To-day every one seems to be waiting for some one else to start active buying, and no one cares to take the initiative. Some new condition will undoubtedly arise, which will start the upward movement.

The dealers are having a better month than last, a fact more pronounced in the supply than in the machinery trade, but the increase over April is only about the same percentage as in other years, and if seasonable buying continues on the same relative basis there will be a falling off as the weather gets warmer. There is much interest in the effect that the closing of the national conventions will have upon the situation. There is no longer a strong belief that a reaction for the better will immediately follow. The usual prophecy is that it will require the autumn influence, and possibly the settlement of the Presidential campaign before any very important change develops in business. The excellent crop reports for the West are having a cheering effect, and in New England the starting up of large textile mills on full time has added buoyancy to the situation.

The important announcement is made that Eugene Childs, recently general superintendent of the Trimont Mfg. Company, Roxbury, Mass., manufacturer of wrenches, is organizing a new company, which will locate a factory in Charleston, W. Va., where a general line of wrenches similar

to that of the Trimont Company will be manufactured. Mr. Childs, whose address is 112 School street, Roxbury District, Boston, states that he is not ready to make detailed announcement of the company's plans beyond the location and product, and the fact that the capital stock will be $300,000.

The T. R. Almond Mfg. Company, Ashburnham, Mass., manufacturer of chucks, has been compelled to double its floor space because of increased business, which was especially noticeable during the month of May. The working force is now larger than at any time since the removal of the business from Brooklyn.

There is a noticeable improvement in the power boiler business. The new Massachusetts boiler rules have had their effect, because they have compelled the replacing of quite a number of boilers which did not come up to the restrictions. Another, and perhaps the most important, influence is that manufacturers have taken advantage of the situation to have needed work done in their boiler rooms. This includes permanent improvements, as well as work that is ordinarily done in the autumn. The fact that it is cared for in the spring and summer may have a tendency to affect the usual fall briskness in the boiler trade. One large boiler works reports that it has booked a greater number of orders in May than in the total of the first four months of the year, though the statement must be corrected as to totals in money value of the business, because the May orders include a large percentage of small items. But on the whole the boiler business is showing marked betterment, and the manufacturers are hoping that it is a permanent one. It is known to them that a good many New England concerns have power plant improvements in view, but most of them are unable or unwilling to spare the money for the purpose at this time. These orders may be expected later, however.

The Bridgeport Wire-Wound Box Company, Bridgeport, Conn., is to establish a plant in that city for the manufacture of a new type of box, and states that it will be in the market for woodworking machinery of various kinds. The company has a capital stock of $60,000. W. H. P. Roots is the president, Charles O. Collett, vice-president, and William Arthur, secretary and treasurer, all of Stamford, Conn. The product will be a patented wire bound box for use in shipping goods. The advantages claimed for it are lightness and strength and an arrangement which allows of a lead seal in a simple manner.

Work has begun on the establishment of a hydraulic plant on the Carrabassett River, between Embden and North Anson, Maine, by the Franklin Power Company, formerly known as the Carratunk Power Company. An electric generating equipment will be installed and the power carried in high potential current to New Vinyard, Farmington and Wilton, Maine. The company has a capital stock of $100,000. S. O. Tarbox, Farmington, is president, and C. O. Sturtevant, Winthroy, Maine, treasurer.

The Oxy-Carbi Company, 17 Webster street, New Haven, Conn., has begun the manufacture of oxy-acetylene welding and cutting plants, and a general business of welding and brazing in cast iron, semisteel, soft steel, copper and brass.

A dispatch from Waterbury, Conn., states that the American Brass Company has resumed work on new mills and purposes to rush them to completion in order to have the buildings ready for occupancy in the fall. The dispatch goes on to state that much of the rougher work done by the company will be concentrated in the new buildings.

The Supreme Knitting Bobbin Company, 99 Stewart street, Providence, R. I., has been incorporated under Maine laws to manufacture a new knitting bobbin, the invention of Simon W. Wardwell of that city. Edwin C. Smith, Seekonk, Mass., is president; Arthur I. Harvey, Providence, vice-president; Daniel McNiven, Pawtucket, R. I., secretary; Charles A. Eddy, Providence, treasurer; Simon W. Wardwell, manager; William A. Booth, Woonsocket, R. I., general superintendent; the officers and Arthur A. Armstrong, Providence, constituting the Board of Directors. While the company states that it is not ready to announce its plans, the plant for the manufacture of the new device will be located in Providence. It is stated that the invention has been given ample test under manufacturing conditions.

The Chapin-Stevens Company, Pine Meadow, Conn., states that the report of the acquiring of the Martin Doscher plant at Saugatuck has little foundation in fact. Since the death of Mr. Doscher the Chapin-Stevens Company has purchased a small amount of the machinery, and finished and unfinished stock has been variously disposed of in the trade, but there is no truth in the report of a combination of the carpenter tool industry.

The Chelmsford Foundry Company, Medford, Mass., announces its complete reorganization, which was accomplished by the resignation of the old Board of Directors and officers. The board now consists of George M. Harrigan, president of the Lowell Trust Company, Lowell, Mass., as president; Fred A. Houdlette, president of Fred A. Houdlette & Son., Inc., Boston, as treasurer, the third director being William H. Perry, Warwick, R. I., president of the William H. Perry Company, iron merchant, and a director of the Industrial Trust Company, Providence, R. I. The general offices have been removed from 159 Devonshire street, Boston, to the works at Medford, which are easy of access from the Boston & Maine Railroad, Medford Branch, and from a new street railroad line now under construction from the Sullivan square elevated station, Charlestown. The company states that it has at its plant a good stock of steel for structural purposes, which is being consantly increased, and that its foundry is in first-class condition to handle orders.

Philadelphia Machinery Market.

PHILADELPHIA, PA., June 2, 1908.

Manufacturers and dealers generally report the volume of business transacted in May as having exceeded that for the previous month, but the amount, with the exception of a few cases, was not large. The market has been quite irregular. One week's business will come out quite freely and the most optimistic feeling will prevail; the next week, however, may be extremely dull and the hopeful feeling disappears, only to be revived again when the next spurt in buying comes along. There is, however, a slow, moderate gain, which does not show itself on the surface, and it is pretty generally felt that this moderate improvement will continue during the summer months, with more active buying in the fall—after political matters, crops and other features on which prosperity is based have become closed incidents.

Some manufacturers and merchants report more active conditions. One seller has received orders for several lathes, milling machines and a number of small tools; while others report sales of drill presses and special tools. Sales in almost every case have been of a single tool to a customer, the larger propositions before the trade being still held in abeyance. Some of these are believed to be getting near the point when they will develop into actual orders, while there are one or two other pretty good propositions in the way of equipment that are being considered by the probable purchasers. Some business which has been held back pending more definite information regarding prices has been placed since the Atlantic City convention, it being evident that no concessions will be made by manufacturers of the usually termed standard grades of tools.

The railroads and the larger industrial concerns in this territory are still out of the market, and as there seems to be but little improvement in their respective lines, the amount of business expected from those sources is small.

There has been practically no change in the export demand. Some little business in the way of special machinery has come out but the demand for the general line of machine tools is decidedly small. Power equipment specialties continue in good demand, but while orders are numerous their individual size is hardly up to the normal.

Second-hand machinery merchants report increased inquiries and resultant sales are more numerous. This branch of the trade continues quite active, and buyers are canvassing the market pretty thoroughly, owing to the reduced cost of equipment, before placing orders for new tools. Most of the business is confined to single tools of the medium and smaller classes, but the aggregate sales reach very fair proportions.

Some improvement is to be noted in foundry trade, but the plants are still running on short time. Orders are largely of a hand to mouth nature, and while the field is being actively canvassed for orders few contracts for any considerable tonnage come out.

Sealed proposals will be received by the Pennsylvania Commission to erect a State Hospital for the Insane, at its office, room 207, 1435 Chestnut street, this city, for buildings, reservoirs, sewage disposal plant, coal handling machinery, cast iron water pipe, special castings, valves, excavation and concrete work for the Homeopathic Hospital for the Insane in Hanover Township, Lehigh County, Pa. Bids will be received until June 8. Plans and specifications may be had of Philip H. Johnson, architect, 1824 Land Title Building, Philadelphia, Pa.

John T. Windrim, architect and engineer, is preparing plans for a one-story central steam heating and electric light plant, to be built in this city for the Girard Estate. This plant is to be operated for the purpose of furnishing light and heat for a large number of houses to be built in the southwestern section of the city.

The Board of Managers of the State Hospital for the Insane, Trenton, N. J., will make extensive improvements at that institution. Among the equipment to be installed are new apparatus for the laboratory, new baking machinery, artesian wells and casing, pumping machinery for water supply, telephone, fire alarm and night clock systems, &c. The amount appropriated for the work is over $60,000.

The city of Salem, N. J., contemplates extensive improvements to the water works.

The Pressed Steel Mfg. Company reports a stiffening in the demand for pressed steel shaft hangers and pillow blocks from various parts of the country. Orders received are from widely scattered points, but the number is larger and

the quantities being taken are better. The foreign demand continues quite active, and a number of shipments for export have been made, while orders recently taken include one for 150 hangers, for stock, for Manila, P. I.; another for 100 large hangers from Switzerland, and a large order for miscellaneous hangers from France.

Government Purchases.

WASHINGTON, D. C., June 2, 1908.

The Isthmian Canal Commission will receive bids until June 24, Circular No. 444, for boiler room equipment, consisting of boilers, induced draft fans with direct coupled turbine and motor, feed water heater, boiler feed pumps, &c.

The Isthmian Canal Commission will soon ask bids for four long stroke riveting hammers, two wood boring machines, two water tube boilers, 18 air hammer rock drills, 4 12-in. engine lathes, 4 24-in. back geared crank shapers, 4 sliding head upright drill presses and other supplies.

Circular No. 445, bids to be opened June 22 at the office of the Isthmian Canal Commission, covers pneumatic hoists, jacks and various supplies.

Bids for the material and installation of a complete electric lighting system for the United States Government at Jefferson Barracks, Mo., will be received until June 15. The machinery required for this installation will include three 150-hp. water tube boilers, two 156 and one 112 hp. tandem compound engines, three electric generators, pumps, 20 street arc lamps, with all necessary auxiliary equipment, and the wiring of about 80 buildings. Detailed information concerning these requirements can be had on application to Capt. O. W. Bell, constructing quartermaster.

The following bids were opened May 25, Circular No. 440, for supplies for the Isthmian Canal Commission:

Class 1.—Six reversing hoisting engines—Bidder 2, American Hoist & Derrick Company, St. Paul, Minn., $12,132 and $7368; 9, Bethlehem Steel Company, South Bethlehem, Pa., $8550; 10, H. L. Bond Company, Boston, Mass., $8775; 16, Thomas Carlin Sons Company, Allegheny, Pa., $9708; 33, G. & W. Mfg. Company, New York, $8340; 36, Glover Machine Works, Marietta, Ohio, $9000; 48, Lambert Hoisting Engine Company, Newark, N. J., $9600 and $10,200; 49, Lenher Engineering Company, New York, $7800; 50, Lidgerwood Mfg. Company, New York, $11,820, $12,120, $12,540 and $12,870; 54, Mead-Morrison Mfg. Company, Cambridge, Mass., $11,400; 59, New Jersey Foundry & Machine Company, New York, $9486; 65, C. T. Patterson Company, New Orleans, La., $10,326; 66, Queen City Supply Company, Cincinnati, Ohio, $8400; 72, J. Jacob Shannon Company, Philadelphia, Pa., $8262; 82, Vermilye & Power, New York, $9600; 86, Williamson Brothers Company, Philadelphia, Pa., $7200.

Class 2.—One vertical car tenoning machine—Bidder 3, Atlantic Works, Philadelphia, Pa., $952.50; 6, Bentel & Margedent Company, Hamilton, Ohio, $885; 28, J. A. Fay & Egan Company, Cincinnati, Ohio, $1013.50; 31, Fox Bros. & Co., New York, $1022.83; 37, Greenlee Brothers & Co., Chicago, Ill., $785; 53, Manning, Maxwell & Moore, New York, $1030.

Class 3.—One extra large automatic power gaining machine—Bidder 3, Atlantic Works, Philadelphia, Pa., $1105; 6, Bentel & Margedent Company, Hamilton, Ohio, $1200 and $1300; 28, J. A. Fay & Egan Company, Cincinnati, Ohio, $1498; 31, Fox Bros. & Co., New York, $1516.16; 37, Greenlee Brothers & Co., Chicago, Ill., $1120; 53, Manning, Maxwell & Moore, New York, $1570; 89, S. A. Woods Machine Company, South Boston, Mass., $1209.

The following bids were opened May 26 for machinery for the navy yards:

Class 152.—One universal sand papering machine—Bidder 5, American Wood Working Machinery Company, Rochester, N. Y., $248; 61, J. A. Fay & Egan Company, Cincinnati, Ohio, $306; 197, H. B. Smith Machine Company, Smithville, N. J., $414.39.

Class 153.—One pony planer—Bidder 5, American Wood Working Machinery Company, Rochester, N. Y., $647; 148, Oliver Machinery Company, New York, $840; 197, H. B. Smith Machine Company, Smithville, N. J., $656.

Class 154.—One motor driven fan and condenser outfit—Bidder 189, B. F. Sturtevant Company, Hyde Park, Mass., $558.95.

Class 155.—Two wet emery grinders—Bidder 64, Frevert Machinery Company, New York, $329 and $338; 141, Niles-Bement-Pond Company, New York, $280; 175, Ransom Mfg. Company, Oshkosh, Wis., $281; 197, H. B. Smith Machine Company, Smithville, N. J., $277.50.

Class 321.—One portable molding machine—Bidder 149, S. Obermayer Company, Cincinnati, Ohio, $310; 164, J. W. Paxson Company, Philadelphia, Pa., $225; 205, Tabor Mfg. Company, Hamilton, Ohio, $270; 217, Vermilye & Power, New York, $290.

The Pratt & Whitney Company, Hartford, Conn., has been awarded class 71, one tool makers' engine lathe, $1413.25, under opening of April 14, and class 134, one hand milling machine, $282, under opening of April 21, for machinery for the navy yards.

Under opening of May 10 for machinery for the navy yards, the Frevert Machinery Company, New York, has been awarded class 1, one milling machine, $1240.

The following awards have been made for machinery for the navy yards, bids for which were opened May 12:

General Electric Company, Schenectady, N. Y., class 1, four motor generator sets and switchboards, $16,000; class 2, 12 single phase transformers, $1083.39.

Crane Company, Chicago, Ill., class 7, one hot water heating boiler, $338.80.

Pratt & Whitney Company, Hartford, Conn., class 171, three engine lathes, $690.

B. F. Sturtevant Company, Hyde Park, Mass., class 701, four electric motors and spare parts, $1384.80.

Quincy, Manchester, Sargent Company, Plainfield, N. J., class 711, one 5-hp. motor, $225; class 712, one boring bar, $420.

Customs Decisions.

The Steel Wool Case.

Within a few days the Supreme Court is expected to decide whether it will hear arguments in a test case relating to the rate of duty applicable to so-called steel wool. Most of the steel wool used in this country is said to be imported from Germany, but recently the manufacture of the product, which is used chiefly in polishing furniture and floors, has begun in this country. The domestic industry, it is alleged, cannot thrive unless protected by a high duty against the German product. The Buehne Steel Wool Company, Freiburg, Germany, maintains, on the other hand, that the American concern, aided by the Government, is seeking to have levied a duty prohibitive to foreign importations.

Henry M. Hoyt, Solicitor-General of the United States, and his assistant, Edward T. Sanford, in a brief filed with the Supreme Court, state that the recent decision of the Circuit Court of Appeals, at New York, in the steel wool case will, if allowed to stand, "inflict a blow of the most far-reaching and serious character to the steel industries of this country." Albert H. Washburn of the law firm of Comstock & Washburn, counsel for the Buehne Company, tells the court in his brief opposing the issuance of a writ, that the finding of the Appellate Court is right, and should not be reviewed by the tribunal of last resort. Mr. Washburn holds that the decision of the Court of Appeals classifying the steel wool under paragraph 137 as a manufacture from steel wire at a rate of duty depending upon the gauge and value of such wire is equitable and should not be disturbed. Solicitor-General Hoyt insists in his brief that the case should be heard and a decision made holding the article dutiable at 45 per cent. under the provision for "manufactures of metal or steel."

The decision of the Circuit Court of Appeals is the latest of a series of cases, and is in conflict with all other previous decisions on the subject. It was held by the Board of United States General Appraisers in 1899 and again in 1905 by a majority decision that steel wool is dutiable under paragraph 135 of the tariff act as "steel in all forms and shapes not specially provided for."

When the issue reached the Circuit Court that tribunal reversed the former decision, and found that both the importers and the Government were wrong in their contentions. The court held the merchandise dutiable under paragraph 137 referring to manufactures of wire. This latter claim was affirmed by the Circuit Court of Appeals, and forms the basis for the importer's brief filed with the Supreme Court. The Solicitor-General warns the Supreme Court that the imposition of duty under either paragraph 135 or 137 would deprive American manufacturers of adequate protection. The court is asked in view of this to declare for the imposition of the 45 per cent. duty as "manufactures of metal."

The Transvaal Government and the Johannesburg Chamber of Mines have arranged for a rock drill contest beginning in April, 1909, and extending over a number of weeks. The conditions for entering the contest are that the drills must not exceed 100 lb. in weight, and compressed air drills are preferred. Contestants are to furnish three drills of each type, at least, but can supply more if they wish. All drills are to be tested at six or more mines by operators furnished by those conducting the contest. Dust allayers, either attached or otherwise, are to be furnished, and entries will be closed by December next. Inquiries for application conditions should be addressed to the Johannesburg Chamber of Mines, Johannesburg, South Africa.

Cammell Laird & Co., Ltd., have removed their office and warehouse to 25 Cliff street, New York. This is the firm's principal warehouse in the United States. A large stock of Cammell Laird & Co.'s high speed and carbon steel is carried there, from which its numerous subagencies throughout this country and Canada are supplied.

HARDWARE

WHILE the Philippines are an insignificant market compared with other foreign fields the progress which has been made in the extension of American business with these islands may have some bearing on the general question of the development of our export relations and may illustrate some of the conditions under which foreign business is carried on. There may also be some lessons in regard to the realizing of the ambition of this country to occupy a prominent place in the world's trade. In this connection some figures covering our export trade with the Philippine Islands during the calendar year 1907, as compared with previous year, which have been compiled by the Bureau of Insular Affairs, are of interest. They show a steady increase in the imports into the archipelago of Hardware and other manufactures of metal, but at the same time indicate that American manufacturers are not increasing their trade in these lines at least, but are permitting their European rivals, and especially their British competitors, to supply the steadily increasing demands of the people of the islands. Even in those items in which the share of the United States is greater than that of any other country there has been a proportionate decline in the American exports.

The statistics in regard to the sales of Hardware and related goods by this country and by other countries to the Philippines during 1907, are certainly not especially encouraging. It is, however, gratifying to note that there was during 1907 an increase in the total importations into the islands from all sources as compared with 1906. This is indicated in the following table, which is based on official statistics according to the classification used by the Government:

	1906.	1907.
TOOLS	$96,562	$111,510
BUILDERS' HARDWARE	29,110	36,898
CUTLERY	52,303	84,710
"FINE ARTICLES," PENS, HOOKS, &C.	27,295	36,142
NAILS, SPIKES, &C	38,173	46,227
BAR IRON	51,936	59,668
STEEL BARS AND RODS	29,508	58,354

While these aggregates are not of imposing volume, their general tendency to increase is of interest, showing that progress is being made in the purchasing power of the Philippines and in the development of their international trade. A study of the figures, however, does not yield conclusions altogether gratifying to our manufacturers.

Comparing the years 1907 and 1906, the total importations of tools into the Philippines increased about 15 per cent. While the amount supplied by the United States shows a slight increase the shipments of Germany increased nearly 60 per cent., and those of Great Britain over 20 per cent. Carried back to 1905 the competition is equally unfavorable, the proportionate share of this country having steadily declined, while that of German and British manufacturers has risen. In Locks, Hinges and other Builders' Hardware the contribution of the United States decreased about one-half, while that of England increased over 50 per cent. Equally significant is the fact that in 1906 we furnished more than one-half the total imports of these items and in the succeeding year only about one-fifth. German importations of cutlery increased 50 per cent., while those of the United States declined 15 per cent., carrying us down from second place to fifth, below Germany, Belgium, France, and Great Britain, in the order named. In "fine articles," a total increase in importations is shown, amounting to nearly 33 1-3 per cent., but the United States only gained between 20 and 25 per cent., and fell from second to third place among the competing nations. Similar tendencies are shown in Nails, Spikes, Tacks, &c., our share declining about 20 per cent., while the total imports increased upward of 20 per cent. In bar iron Great Britain easily held the lead, the contributions of the United States showing fair relative increase, but amounting to a very small percentage of the total trade.

So far as the Philippines are concerned, these facts would indicate that special attention must be given to the cultivation of these markets, unless the great bulk of the business is to revert to German and English houses. Whether or not it is worth cultivating is, of course, a question which each manufacturer must determine for himself. The patriotic desire to have a lion's share of the business of our Asiatic possessions is laudable, but it is being more and more recognized, as announced by Andrew Carnegie, that trade follows the price-list rather than the flag. The figures which show how things are going in the Philippines may, however, serve a more important purpose if they impress upon manufacturers and merchants the difficulty of securing and holding foreign markets in general. With our splendid facilities for production it must be remembered that our competitors abroad are very much awake, and with their constant contact with foreign markets, their experience in cultivating them and their thorough familiarity with their methods and requirements it is not the work of a summer's holiday for the United States or its manufacturers to capture distant markets. It is better to look on this endeavor as involving, as it undoubtedly does, uphill work and a long fight. This, however, is no reason why individual manufacturers should not push energetically for the placing of their goods in foreign fields in the many cases in which what can be accomplished will justify the labor and the outlay.

Condition of Trade.

Taken all in all reports do not show any important change in the general situation and the market is still subject to conflicting influences. There is probably on the whole a generally better feeling throughout the trade without special increase in the volume of business. With the opening of summer the trade is experiencing the quieting influence expected at this season, without any such change in the general state of the market or in Hardware lines in particular as would call for more courageous buying than has of late been indulged in. Orders are consequently small and frequent to meet the needs of stocks which, both in jobbers' and retailers' hands, are moderate and in some cases depleted in spots. The startling event of the week was the reduction in the price of Steel Bars, which, notwithstanding the evident difficulty of maintaining the old price, came as a surprise to the trade, following as it did so closely on the confident announcement that the policy of maintaining prices would be adhered to by the great Iron interests. The immediate effect of this reduction will probably be to weaken con-

fidence in the strength of the market as a whole, illustrating as it does the difficulty of keeping up quotations in the presence of trade influences tending toward the lowering of prices, even by the wise and concerted efforts of great interests. Questions are also naturally suggested as to whether changes in other Iron products may not follow under the pressure of the same influences as were found in the case of Steel Bars to be too strong to be further resisted. While the trade is conjecturing in regard to the course of the market there is enough current business to continue the good work of clearing up stocks, getting accounts in shape and laying a foundation for a return to better times. Fortunately the outlook for the crops continues excellent, and it is hoped that good harvests will contribute substantially to promoting a return to full confidence and a large measure of prosperity.

Chicago.

Beset by adverse weather conditions through the first half and unsupported by marked improvement in general conditions at any time, the month of May can hardly be expected to outrank its predecessor in jobbers' sales totals; they will, in fact, probably fall a little below those of April, and as compared with the corresponding month a year ago will show a loss of not less than 25 per cent. In comparing the results of last year periods with those of this year it should be taken into account that whatever change in values has taken place in the meantime has been almost uniformly downward, and therefore the volume of goods represented by a given sum at the present time will be somewhat greater than for a similar sum last year. Perhaps the most notable feature of trade development is seen in the demand for Screen Cloth, which in the past 10 days has been highly satisfactory. It was felt as the season advanced without bringing out even the usual percentage of reorders that hopes of their appearance would be disappointed, and but for the excessively wet weather of the spring months this would doubtless have been the case. Fostered by the abundance of water, flies, mosquitos and other insects have multiplied prolifically and their presence in countless swarms has recently emphasized the need of protection from their annoying attentions. The result has been that even now at the end of the season there is an exceptionally good demand for Wire Cloth and Screen Doors. Moreover, the prospect for its continuance for some time yet is most encouraging. In no other line has any noteworthy movement developed. The summer season is not, as a rule, favorable to vigorous market reactions, and if business can be maintained at its present volume through this period the expectations of the trade will perhaps be fully met. Barb Wire, Nails and other Wire products which have held the lead in the market are falling back and the season's business is practically ended. It is believed that purchases by both jobbers and retailers have been conservative, and that when buying for the fall trade begins there will be no surplus stocks either at the mills or in stores.

New Orleans.

WOODWARD, WIGHT & CO., LTD.—Business for May is quite a little more slack than it was for April, not only in the Hardware and Supply lines, but also with the grocers and feed merchants and the wholesale and retail dry goods people. A demand will, however, spring up here on Heavy Hardware, Supplies and Machinery in June and July for the sugar planters in getting their refineries ready to operate in the fall.

In the country around here, the pay of the ordinary day laborer has decreased from about $1.75 to $1.10 per day, and as a consequence the demand for the better grades of dry goods and groceries has fallen off and there is general complaint among the laboring classes about the high prices of food products.

The financial situation here in the city is in very good shape. Money rates are comparatively easy, and funds can readily be got by merchants in good standing, but the consuming demand everywhere is very light.

There is a small but steady business coming in for all of us, and while we anticipate a little spurt in June and July from the sugar planters and some from the cotton planters, there does not seem to be any buying demand in sight before the fall of the year.

Collections are coming in very well, however, in fact better than they were this time last year.

Baltimore.

CARLIN & FULTON.—Since our last letter the uncertainty attending the actions and prices of the steel interests of the country has been dispelled by the meeting of a few days ago. The announcement made of no intention to reduce prices fixes the stability for some time to come of a large part of the cost of many manufactured goods. The adjournment of the meeting for the summer indicates that there is no probability of an early change of opinion as to the wisdom of maintaining present prices. This action may or may not be disappointing to many. Undoubtedly there had been expectations that following the dullness of the winter and spring a slump in prices would be in order, but overlooking the fact that prices had never been advanced to any great extent, having been arbitrarily held within bounds by the conservatism of the largest interests in the trade in spite of great opportunities to do differently.

Trade seems to be gradually improving, and the demand for seasonable goods is quite active. The advent of hot weather has brought the growing fruit crop through with safety, and soon the country will be harvesting another wheat crop. A large acreage of cotton is in process of cultivation, and while the price is less than that of a year ago, it is hoped the difference will be compensated for by a larger yield.

The combination recently in this city of the circus, the races, and one of the largest church conferences proved too great for the elements and throughout this section we have had a great deal of rain, resulting, however, in great benefit to the grass, and the hay crop will be of large proportions.

The general crop prospects being good, once more the agricultural interests will come to the relief of the country, and probably the emergency currency obtainable under the new bill just passed by Congress will never be needed, at least for some years to come.

The country has passed through a process of liquidation and by the time the fall season approaches the stocks of merchandise, whether in the hands of manufacturers, wholesalers or retailers, will undoubtedly be so depleted that the every day consumption of the nation means business independent of who may be elected to the Presidential chair.

Cleveland.

THE W. BINGHAM COMPANY.—We can see a decided improvement in the number and size of orders that are coming to us from our salesmen who solicit business from the country trade; also the orders from our city salesmen are larger and coming oftener, consisting of a pretty fair assortment of miscellaneous goods as well as season goods. Customers are taking heart and buying more goods for shipment in the future, as they realize if they are going to do business at the same old stand, they have got to keep their shelves stocked up.

It looks very much as though the turn of the tide had come and we are very hopeful of the future. If only the manufacturers could see their way clear to increase their output, and the railroad companies could feel safe in putting money into new lines and replenishing the old ones, we would be on "Easy Street" very soon.

There is one thing sure, with the outlook for the abundant crops of grain and fruit this fall, if something is not done very soon to put our railroad traffic in good shape, there will be a great many complaints about service that the railroad companies are not able to give to move these crops. Confidence is surely being restored in many quarters.

Now that Congress is about to adjourn, legislative agi-

tation will cease, and business will resume its normal state soon.

Spring and summer goods of all kinds are going forward in good volume. There is considerable inquiry for Black and Galvanized Sheets, Pipe and Fittings, and in some sections they are buying quite freely.

The dividends that the large corporations have been able to pay their stockholders are putting a lot of money into circulation. When you stop and think that the Pennsylvania Company have 59,415 stockholders who will participate June 1 in a dividend of $9,437,839.50, it shows that somebody is going to have some money to spend on their summer vacation. This is a good omen of future prosperity.

All the business man asks is, to be let alone, and he will take new heart and do a great deal to keep the dinner pail full and make prosperous times.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—Nails and Wire did not decline. We must admit we were surprised. We confidently expected a reduction. The tires have been pumped up good and hard. How long will they run without requiring more pumping?

The action of the large Steel interests certainly indicates confidence in their own strength. It also indicates confidence in the general situation. This point of view is at least reassuring.

The argument is used that Steel products are no higher proportionally than farm products. Corn in Missouri and Illinois is to-day selling at 75 cents per bushel. Wheat has passed the dollar mark. There was a time when corn at 40 cents was considered high and wheat at 60 cents was good money. The comparison of Steel and agricultural products is at least ingenious.

The comparison, however, does not go when it comes to hogs and cattle. Low priced hogs with 75 cents for corn! There must be a lot of hogs or a lot of manipulation. Which is it?

We live in the exact center of prosperity. On June 1 in this neck of the woods, employees will be taken back. We never discharged any employees. We have more salesmen now than we had a year ago. In some departments we have more employees than we had a year ago.

Up to this writing (May 30) we have not seen any wonderful increase in business. But next Monday, June 1, we expect to see it all different. We are glad the time has come, because, with the exception of one month (February), our business has fallen off every month this year.

Laying joking aside, we anticipate a quiet June and July. In the present mood of the trade merchants will not buy heavily until they feel a substantial demand from consumers.

The situation reminds us of the story told by Mark Twain. He could not eat. The sight of food nauseated him. He had no appetite. He went to a sanitarium. They shut him up in a nice room with plenty of books and flowers. There was a chart of his case hanging on the wall. They gave him everything but food. Meal times came and went, but there was no bell and nobody came with a tray. After the second day Mark Twain sent for the doctor and said: "Look here! I want something to eat." The doctor replied: "Why, I understood the sight of food nauseated you." "Cut that out," answered the great author. "Bring me a good square meal, and bring it quick."

So we feel that some of these days the consumer of this country will want goods and he will want them quick. Just now he is preparing a good, big appetite.

Present conditions are natural, and in many ways beneficial. Things are getting down to a healthy basis. Balloons are being pricked.

In our territory collections are quite fair, and losses from failures have not been serious.

We believe the general trade to-day is in much better shape than it was this time last year. Merchants have been paying off their debts. They have been trimming up their stocks. They have been buying carefully. Why has not all this been a good thing? In the boom days, some merchants bought too much and they bought recklessly. But after all, there has been very little actual suffering. We do not believe many of our customers have missed any of their meals.

We are not enthusiasts and we are not overly optimistic, but we cannot see, if we have a fairly good crop this year, at the very high ruling prices of agricultural products, how we can help having a large business this fall—politics or no politics.

You must, however, take into consideration a large portion of our business is in the agricultural districts and in the medium and small size towns. Probably conditions may be distinctly different with those jobbers who draw the larger share of their business from manufacturing sections. Nevertheless, we cannot have good crops and good prices in the agricultural districts of this country without the good times being felt in the manufacturing centers.

Taking the situation all in all, it looks good to us, but the past month we were not worked to death by the size of our orders. Competing salesmen please take notice and don't work so hard.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—Trade is passing through the usual quietude of May with the prospect of similar experience in June. We await on the one hand the results of farmers' work and weather conditions as to what shall be produced, and on the other hand the outcome of sundry meetings in New York as to whether anything in the way of Iron or Steel shall be reduced. The latter is determined by men's votes to a large extent. The committee gets together and decides whether or not there shall be any attempt to stimulate the market by a reduction in price, and what they decide on is good until next time. At least that is the theoretical working out of the trust's operation, and this time they have decided in the negative.

There are still those who believe it is healthier to let things take their natural course up or down according to the market. The present condition is something like that of a sea sick individual, who is not quite sea sick enough to let go. We are told in all such cases it is better to have it up and over with for the health and comfort of the patient; that he has less reckoning—dead or otherwise—with the dinner table and sidewalks after he gets on shore, if he has really and actually paid his debt to Father Neptune.

Just when we are told that things are truly prosperous, and are enjoined to get into the band wagon possibly (we ourselves do not see it because we do not open our eyes wide enough or look in some particular direction), then there comes a revelation like that of the Pittsburgh Terminal Company, with its shortage of earnings and general disappointment to the people, who had reasons to expect over half a million should be disbursed for their benefit, or the failure of an Allegheny National Bank, with an untold deficit.

Now we have to go to work and earn something before we can have it, we might as well recognize that. People are not swallowing securities at a gulp, as they were two or three years ago, but must be persuaded at their actual worth. It is good, healthy reaction that we are bound to undergo. Nature intends that every now and then we should take a day or a year off. It gives us an opportunity to reflect how we may best spend the money that we earned in the times of genuine prosperity. It makes us realize that we could have done something better with it than we did, and persuades us that there is something more imperishable than even bonds in a strong box; and we reflect on the good causes that we failed to encourage because we did not take time enough to consider their claims, and the margin that would have looked very handsome as a subscription opposite our names on some worthy list has gone glimmering as the stocks or notes or bonds took their place on the steeply inclined toboggan. It is better now, somewhat, and margin taking is once more a pastime of the bulls.

Meanwhile there are evidences of improved condi-

tions in other directions, too. The column "help wanted" is gradually swelling in the evening papers; bakers, barbers and blacksmiths, no end of painters and farmhands are advertised for; and, while the column of "situations wanted" has not shrunk, there is evidently something to be said on both sides. The vacations asked for are not shorter than usual, but, on the contrary, are longer, showing that money has been saved up to tide over this non-earning period, and that the practice of taking several weeks off for a "good time" is becoming more and more universal. So be it; the picture of the girl in the hammock is just as attractive as it used to be, although somewhat trite as an advertisement. No one is a slave when under the apple tree.

Portland, Oregon.

FAILING, HAINES & MCCALMAN.—The conditions on the North Pacific Coast continue comparatively good, and we out here really cannot complain when we read the "hard luck" stories that the newspapers are publishing under Eastern headlines. We hope, however, that this is not as bad as it is painted. We notice in one of the trade papers an item commending the so-called Prosperity Association, started in St. Louis for the purpose of encouraging confidence in the future of business. This seems to us to be a good thing, if it is necessary, but when we look over the country and see the boundless possibilities of the Pacific Coast we do not feel out here the need of any association to make us believe in a bright future for business, and when we say a bright future we do not mean that it is far in the future, but right at hand.

Our belief is largely explained by the fact that the crops could not promise better in all lines, and that there is a prospect of a favorable price. The lumber industry, while still in a very poor condition, is possibly, we are informed, in a better condition than it has been for some time past.

The railroads that had stopped their work have commenced again, and in every way it looks as though the latter half of the year would be prosperous.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The Hardware jobbers of the South are now passing through the dullest period of the whole year. A great majority of them are working on their annual inventory, and otherwise rounding up the year's work. When they finish up this work and review the past 12 months' business, they will no doubt find it far from satisfactory, as we do not suppose there is a single jobber in the South who has made much money in the last six months.

As for the present and the future, we are glad to report that things look like they are slowly improving. The improvement, however, is in spots, some sections reporting much better conditions than others. The best feature of the situation is the splendid crop prospect that now exists almost over the whole South. With good crops we certainly ought to have pretty good business this summer and fall, and we think jobbers and retailers should make their preparations to take care of a good fall trade. The dealer who has a well assorted stock of goods this fall is going to be the man who will get the business and make the money.

While we would not advise overbuying in any way, we certainly think it will pay the trade to carry well assorted stocks from now on. Collections continue to be remarkably good, and we are surprised at the number of merchants who are discounting their bills.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—The month of May closes with trade conditions in the trans-Missouri region fully as favorable as could be expected. A season of continuous rough and cool weather has retarded farm work of all kinds, particularly corn planting, and everything in this way is in a backward condition. Owing to the effect of the constantly cool temperature small grains do not show up to advantage as in former seasons, and the growth of these cereals is somewhat retarded.

In this section corn is the principal staple, and a great deal will depend upon the size and value of the coming season's crop, but it is too early yet to form any kind of an opinion on this important feature. With the advent of warm and genial weather an altogether different aspect would surround the situation. It will undoubtedly come all right, but is very slow and tardy this season.

The whole country west of the Mississippi is in good condition financially, and outside of the annual uncertainty as to the extent of the coming crops there are no developments in sight calculated to disturb the satisfactory volume of business now being enjoyed.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Since our last letter to *The Iron Age*, there has been but little change in trade conditions in our surrounding section. There is, however, nothing in the situation to create any great anxiety as to the future. We write this especially now for the reason that very recently matters of this kind have been investigated by persons high in authority in the Government, as well as by the banks throughout the country and manufacturers in various lines, and it has lately been published that the period of stagnation of American industry is at an end and the tide of prosperity again rapidly coming forward. We note also that the prospect to-day is far better than at any time since the depression set in, and the mills are gradually increasing their working force and output.

It is thought that the iron business will be the last to experience the improved conditions, but this is largely owing to the fact that the demand was so very large during the years 1906 and 1907 that it would be hard to reach that level until the railroads give equally large orders, which is not to be expected.

Some feeling may have existed from the published reports that the gross earnings of the railroads were over 20 per cent. less for the month of May this year than for the same month in 1907. Now this is not surprising or unexpected, as business men are all doubtless aware of the fact that the railroad shipments during the entire year of 1907 were unequaled in this country, and manufacturers, jobbers and retail merchants have not forgotten the trouble that existed in railroad shipments during 1907, owing to the large trade. However, the railroads are coming into the market slowly, and the steel business, as we know, largely depends upon them.

Recent reports on crops estimate the output of winter wheat as over that of a year ago. Spring wheat is said to be of unusually high condition. The financial conditions of the country have largely improved, general bank deposits have increased, reduced rates of interest are charged by banks and quite as low as one year ago. This also appears to exist in foreign countries, and the reduction of the rate of interest by the Bank of England makes it lower than any time (but once) during the past 10 years, and well protected bonds are now bringing high prices.

As we all understand, there has been but a very slight reduction in the price of manufactured Hardware, but had great changes taken place it might have caused considerable excitement not only to wholesale and retail merchants, but to consumers.

It is predicted by many that after, if not before, the election of President and Vice-President provided that crops don't fall down between now and then, trade will largely increase.

Present collections are very fair.

NOTES ON PRICES.

Wire Nails.—New business being received by the mills is comparatively light, being confined to sorting up stocks. The principal activity is specifications on contract orders, which the mills are able to ship promptly. It is understood that prices are being firmly maintained. Quotations for base sizes continue as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots to retail merchants	2.10

New York.—A slight improvement is noted in the local demand for small lots of Wire Nails at store, but the volume of business is far below normal. Nail houses are holding Nails on the basis of $2.40 per keg for small lots at store.

Chicago.—Specifications against existing contracts now constitute the principal volume of business. New orders are coming in slowly, and represent chiefly dealers sorting up requirements. A lull is to be expected at this season of the year, and there will probably not be very much doing until fall buying begins. Price schedules are reported to be uniformly observed. Quotations are as follows: $2.23 in car lots to jobbers, and $2.28 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—New demand for Wire Nails is very light, being confined entirely to small lots for actual needs. What effect the reduction of $4 a ton in prices of Steel Bars will have on the Wire Nail market remains to be seen, but at this writing the large Wire Nail interests are maintaining regular prices, absolutely, but at the same time the trade is apprehensive of a reduction, and is confining purchases to actual needs. It is understood that stocks of Wire Nails in hands of jobbers are at a minimum, which is one argument being used in favor of a reduction. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots to retail merchants	2.10

Cut Nails.—No improvement is noticed in the demand for Cut Nails, orders being for small lots, aggregating a small volume. The market is irregular, and concessions of 15 cents or more are being made on regular Steel Nail quotations, so that about $1.85 for carload lots at mill is more representative of the market than $2.05. Iron Nails generally should command about 10 cents more than Steel.

New York.—Local demand continues light, and small lots fill the requirements of buyers. In view of the lower prices at which Cut Nails are being sold by mills the Nail houses are making the price on the basis of $2.15 per keg for small lots at store.

Chicago.—A revival of activity in Cut Nails naturally waits upon improved conditions in the industries which use them most freely, and there is unfortunately no immediate prospect of such developments. Trade is confined to small orders from miscellaneous sources, the aggregate volume of which is small. Chicago quotations are nominally as follows: In car lots to jobbers, Iron Cut Nails, $2.18; Steel, $2.03; in small lots from store, Iron Cut Nails, $2.30; Steel, $2.15.

Pittsburgh.—While regular prices of Cut Nails have been reaffirmed by the Eastern Cut Nail Association, this action is really without importance as the mills are pursuing an independent policy and selling Nails at whatever prices they see fit. Demand for Cut Nails is for small lots only and for actual needs. The general quotation on Steel Cut Nails is $1.85, but $1.80 or lower has been done in some cases. We quote Steel Cut Nails at $1.85, f.o.b. Pittsburgh, for carload lots, and $1.90 to $1.95 in small lots. Iron Cut Nails take about 10 cents advance over Steel.

Barb Wire.—The advancing season brings with it a diminished demand, and comparatively little new business is expected by the mill in the near future. Shipments on contract orders are in fair volume. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago.—Very few new orders are being entered, although a fair amount of shipments against contract are still going forward from the mills. The season is practically over, and pending the beginning of the fall trade no new tonnage of consequence will be entered. Prices are firmly held at the regular schedule. Prices are reported to be firmly held by the mills. We quote as follows: Jobbers, Chicago, car lots, Painted, $2.38; Galvanized, $2.68; to retailers, car lots, Painted, $2.43; Galvanized, $2.73; retailers, less than car lots, Painted, $2.55, Galvanized, $2.85; Staples, bright, in car lots, $2.35; Galvanized, $2.65; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The season is practically over and new business has dwindled to almost nothing, but a fair tonnage is still going out from the mills on contracts. It is not likely that a reduction in prices of Barb Wire would stimulate demand at this time, but at the moment regular prices are being maintained by the mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95

Plain Wire.—Demand, for the most part, is for small lots, coming from manufacturers of Wire Fencing. Prices are being maintained. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of $1.90 for Plain and $2.20 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.	6 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.90	1.95	2.00	2.05	2.15	2.25	2.35	2.45
Galvanized	$2.20	2.25	2.30	2.35	2.45	2.55	2.95	3.05

Chicago.—What business is being entered by the mills consists of small orders, representing actual present needs of manufacturers. Fence manufacturers are ordering moderate lots in this way, but the aggregate tonnage being booked by the mills is light. Prices are firmly maintained at the regular quotations, which are as follows: Car lots, to jobbers, $2.08, f.o.b. Chicago, and to retailers, $2.15.

Pittsburgh.—Demand is light, and is only for small lots for actual needs. Jobbers are placing orders sparingly in the belief that a change is possible in the attitude of manufacturers towards prices and that possibly a reduction may be made in the near future. In the meantime the mills advise us they are absolutely maintaining regular prices. We quote: Jobbers in carload lots are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.	6 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.90	1.95	2.00	2.05	2.15	2.25	2.35	2.45
Galvanized	$2.20	2.25	2.30	2.35	2.45	2.55	2.95	3.05

Registers.—Confirmation has been received of the reported advance in Registers referred to in these columns a week ago. On June 1, the leading manufacturers announced an advance in Japanned, Electro Plated and Bronzed Registers and Borders, amounting to about 10 per cent., to take effect at once. The present discount to average trade is 70 per cent. Prices on Register Faces remain unchanged, as do those on Porcelain Enamel, Solid Brass and Bronze Metal Goods.

Pipe Cutters.—As stated some weeks ago, the market on Pipe Cutters is now an open one, and prices have developed decided irregularity. Low quotations, said to approximate manufacturing costs, are now reported, one Western manufacturer openly publishing a discount of 85, 10 and 10 per cent. on Barnes pattern, and 85 and 10 per cent. on Saunders pattern Cutters.

Galvanized Ware.—Although leading manufacturers have recently made two noteworthy reductions in their quotations on light Galvanized Pails and Tubs, prices on these goods still show irregularity, due to the competition of independent manufacturers.

Copper and Brass.—The market in Copper and Brass materials continues featureless and quiet, with orders for nothing in excess of actual necessities, notwithstanding the quarter of a cent per pound reduction in Brass Sheets, Rods, Wire and Tubing announced early in May. Some of the factories are running on from a half to three-quarters normal capacity, and orders held up last fall pending a recovery from financial disturbances have been about cleaned up. The work at present is mainly on new orders, which are moderate in volume. The prices of Copper materials, while nominally fixed at the various bases, can be shaded in most instances.

Bolts and Nuts.—Leading manufacturers have made a change in their list prices on common carriage bolts, sending out new price-list, dated June 1. The change affects only 5-16 and ⅜ in. bolts, representing an irregular advance in these diameters ranging from less than 10 to nearly 20 per cent. in the different lengths. Another feature of interest in connection with this market is an apparently general movement on the part of the manufacturers to revert to the old terms of 2 per cent. cash discount. For some months a number of manufacturers have been allowing 1 per cent., but the effort to establish this rate seems to have been abandoned in recognition of the demand of the trade.

Window Glass.—One of the quite prominent hand blown Glass factories has gone out of blast, while others that have been making Glass are understood to be in operation. The warm weather has already had its effect upon the workmen, materially curtailing the production, and continued heat will result in factories becoming short handed. Prevailing conditions certainly point to the desirability of closing down factories, which include low prices, low range of wages and light demand for Glass. No doubt the quantity of Glass now being produced is materially in excess of demand, which may possibly lead to lower prices. The American Window Glass Company's prices are represented by the quotation of 90 and 40 per cent. discount on single and 90 and 40 and 10 per cent. discount on double strength Glass, from manufacturers' list. Jobbers' quotations east of the Alleghenies and north of the Carolinas are reported as being 90 and 35 per cent. discount for single and 90 and 40 per cent. discount for double strength Glass, from jobbers' lists. South of the Carolinas quotations are said to be 5 per cent. higher. Western jobbers' prices are about 90 and 40 per cent. discount on single and 90 and 40 and 5 per cent. discount on double strength Glass, from jobbers' list. In estimating these quotations it must be borne in mind that the jobbers' list is about 25 per cent. higher than the manufacturers' list.

Binder Twine.—As the time for harvest in the Southwest approaches the Twine market shows some indications of weakness, reports being to the effect that quotations have been made, supposedly by jobbers and commission men, from ¼ to ½ cent below the original schedule prices. Concessions in price are not regarded as having had much effect upon the market thus far, and the majority of sellers are said to be holding to regular prices. The Sisal hemp market is weak and lower than for some time, but there is no evidence that Twine producers will increase their output, for this reason, to any considerable extent. The production of Twine has been considerably curtailed this season, while the outlook is for a larger demand than usual. Regular quotations are as follows:

	Cents per pound.
Sisal	8¼
Standard	8¼
Standard Manila	9¾
Manila	11¼
Pure Manila	13

Carload lots, ¼ cent less; 5-ton lots, ⅛ cent less, central delivery, fall terms.

Rope.—A slight improvement is noted in demand, orders being more frequent, but still for limited quantities, evidently covering only immediate requirements. Manila hemp is firmer in tone, but sales of Sisal hemp for June-July delivery are reported at the low price of 4¾ cents per pound. The following quotations, for base sizes of Rope, fairly represent the market for small lots, but are not always adhered to: Pure Manila, 10 to 10¼ cents; lower grades Manila, 8 to 9 cents; Pure Sisal, 7½ to 7¾ cents; lower grade Sisal, 6½ to 7 cents; No. 1 Jute, ¼-in. and up, 6¼ cents; No. 2 Jute, ¼-in. and up, 5¾ cents.

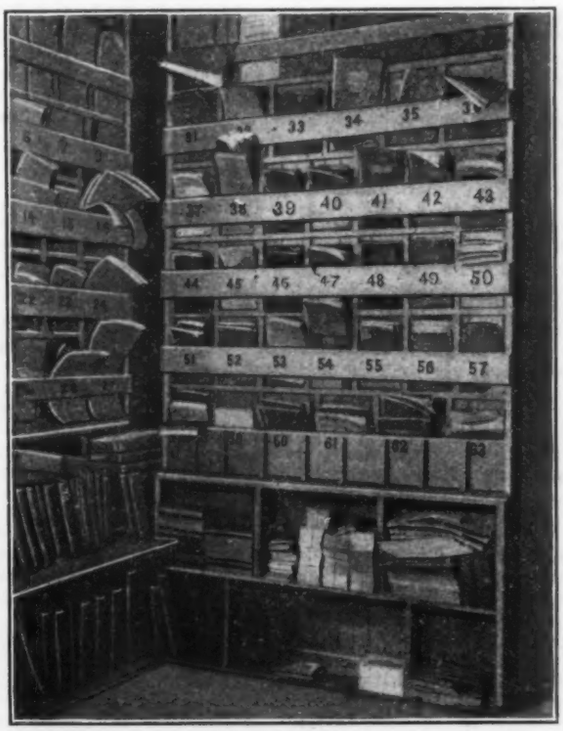
Linseed Oil.—Receipts of Flax Seed at Northwestern points are light, and this is causing crushers some uneasiness, while the Seed market is receiving more than usual strength as the result of this condition. With comparatively light stocks of Seed and Oil in crushers' hands, especially in the West, and all buyers of Oil pursuing a hand to mouth policy in supplying their requirements, it would appear that the Oil market should be strong. Local quotations are as follows: State and Western Raw, 42 to 44 cents; City Raw, 44 to 45 cents per gallon. Boiled Oil is 1 cent per gallon advance on Raw.

Spirits Turpentine.—Demand for small quantities has been fairly good on a declining market caused by heavy receipts of new crop Turpentine at Savannah. Notwithstanding low prices, manufacturers are not stocking up beyond nearby requirements. Prices have fallen off in this market about 2½ cents per gallon, reflecting conditions in the South. The New York market is represented by the following quotations: Oil Barrels, 42½ to 43 cents; Machine Made Barrels, 43 to 43½ cents.

A CONVENIENT CATALOGUE RACK.

IN the Hardware store of James R. Gladwin, Westfield, Mass., there are a number of original ideas utilized which commend themselves to the student of Hardware business methods. This store is well known in the State, having been long established and being one of the pioneers in installing modern methods of accommodating and sampling goods and taking care of various details of the business.

Among other interesting features is the catalogue department, which, while exceedingly simple in arrangement and requiring but little time to keep it up, is distinctly practical and convenient as far as it goes. The catalogues are kept in a rack, the construction of which on the two walls forming one corner of the office will be entirely clear from the accompanying illustration. The rack is divided into compartments which are numbered consecutively, each accommodating three or four books. Catalogues are marked with the number of the section in which they belong and an index arranged alphabetically under manufacturers' names is kept in an ordinary blank book. A cross index under goods is considered unnecessary. Large bound catalogues which must be referred to frequently are numbered and kept in undivided shelves, as shown at the foot of the rack. Besides the fact that catalogues are so accessible and so easily looked up this form of rack has the advantage that it is directly under the eye of the user, who will be able as time goes on to pick out more and more of the catalogues without referring to the index, his memory for the numbers being supplemented by having so many of the catalogues in plain sight, so that he soon becomes accustomed to their appearance, color, &c., and their location in the rack.



Catalogue Rack of J. R. Gladwin, Westfield, Mass.

Alabama Retail Hardware Association.

THE Alabama Retail Hardware Association held its first annual convention at Montgomery on Thursday and Friday, 28th and 29th ult. The sessions were held in the rooms of the Commercial Club. This association was organized last summer, and in view of its youthfulness the attendance was large and creditable, and those present manifested much interest and enthusiasm in the proceedings.

The convention was opened with prayer by the Rev. Leander M. Woods, D.D. B. F. Luttrell, Florala, president of the association, was unable to be present, owing to illness in his family, and Vice-President J. W. Beasley, Birmingham, directed the proceedings in his absence.

Hon. Walter D. Seed, State treasurer, welcomed the association to Birmingham in a felicitous address.

Presidential Address.

Mr. Beasley read Mr. Luttrell's presidential address, which was, in part, as follows:

It is indeed with deep regret that I cannot be with you on the occasion of our first annual meeting, for it is the realization of my fondest hope to see the rank and file of the Hardware trade of our grand old State lining up for its best interests.

It must certainly be a source of especial satisfaction to all of us who have kept up with the doings of Congress through our Hardware journals and otherwise that the proposed Parcel Post measure has been set aside.

While our membership to the present has been small we have had the strong arm of the National Association to wage our battles for us, as it were. Their moral support has been extended in many ways, which were beneficial to the whole trade of the country, but particularly to the more poorly organized branches of the Hardware trade. The Mail Order problem which has been a vexed question for some years past, is fast becoming an uninteresting one, as the manufacturers are not slow to realize that they depend not so much on the catalogue house for the distribution of their wares as upon the great body of retail Hardware dealers. So it appears unnecessary to further attempt to show the great good to be obtained from organization.

Educating Clerks.

Just here I wish to call attention to the fact that many of us need better organization in our own places of business. There are many clerks in Alabama who apparently think little of serving their employers' interest except to such degree as will keep their salary coming. This, in the main, is due to the fact that there are few who do not dread work. We need young men in a Hardware store who don't fear to wilt their collars or get their hands black. In a recent edition of the "Gimlet" by our friend, Mike Kenney, he says there is more loafing done to the square inch in retail Hardware stores than anywhere in the United States. It's true. Our clerks are like the father of the boy who, when asked if his father was a Christian, said: "Yes, but I don't think he is working at it much now." Hard work is the very essence of success in almost anything.

On the other hand, there are many of us employing young men who take no interest in their welfare or our own. To train them is the employer's duty first. We cannot expect efficient help from a boy just let "stay" in the store any more than we would expect to make a good boy by letting him do just as his inclinations might lead.

Let us not feel that money is all there is to live for on this old earth while teaching a boy the intricacies of the Hardware business; let us feel also that it is our solemn duty to instill in him good habits. We can show him that the boy who drinks or gambles or smokes cigarettes is the one that will not last long anywhere.

Let us look carefully into the mutual insurance companies that have grown up with our organization, and if they are founded solidly divide our risks with them.

Helping the Farmers.

Another item we believe will be of inestimable mutual value is for the retail Hardware merchant to help educate the farmer by pointing to improved methods of seeding and cultivation. To take an interest in our farmer friends brings us into closer personal contact, which results in closer understanding.

Let us encourage the passage of laws which will give us pure Paint, pure seed, good roads, irrigation, &c. While we ask the co-operation of the jobber and manufacturer let us in turn show our appreciation by a loyal support of all who are trying to help us by confining their sales to our ranks.

M. L. Corey's Address.

The presence of M. L. Corey, national secretary, was much appreciated. Mr. Corey brought greetings from the national body, and said that with three or four exceptions it now included all the States expected to enlist in the organization. He spoke at length on the operations of the catalogue and mail order houses, and advised that their catalogues be carefully studied and their methods intelligently met. Mr. Corey also touched on parcel post legislation, and its defeat at the session of Congress just closed.

Co-operation with Competitors.

An interesting paper on the subject of co-operation with competitors was read by Vice-President Beasley. We make the following extracts from it:

We learn from standard authority that to co-operate means to work together in harmony toward one general purpose. I am sure all would readily agree that in trade the general purpose is not only to earn a livelihood for one's self and family and lay aside something for a rainy day, but in addition to reap a reasonable compensation for invested capital.

Value of Sharing Experience

Before one can reasonably hope for success to any marked degree, he must have a store of knowledge, which for the most part comes only from the school of experience, and it matters not how much experience he may have had, there come times and arise problems, the solution of which requires in addition to his own knowledge all the observation and all the co-operation and experience which can be obtained from his competitors. There is not a man in the Hardware business to-day, however humble his place may be, who cannot give valuable information if one will approach him respectfully in a heart to heart talk.

Interdependence of Strong and Weak.

It matters not how rich in experience one may be nor how strong financially, he never gets to where he does not need the good will, the experience and the co-operation of every competitor he may have, and it would be absurd to doubt that every one of his competitors needs his co-operation, as well as that of every other competitor. I am sure there is not a member of our Association nor a reasonably intelligent Hardware dealer anywhere who would not readily agree with me that co-operation with competitors is both profitable and pleasant, provided, however, the competitor (or the competitor's competitor) is not the sort of person who would sooner see a $5.00 note burn to ashes than fall into the hands of a neighbor Hardware dealer.

Local Co-operation.

If it is profitable for us as Hardwaremen throughout the State to meet together in annual conventions and exchange ideas and assist in the solution of each other's problems, it must be eminently profitable for local competitors to exchange ideas, share each other's experience and offer friendly suggestions toward the solution of each other's problems. In fact, if only two merchants honestly co-operate they form a miniature convention. I think I am correct when I say that Hardware merchants as a whole possess a higher average of intelligence than perhaps any other class of merchants; then I prefer to treat the subject under the presumption that all competitors are men as well as merchants.

Even Competitors May Be Trustworthy.

Because your neighbor has chosen the same vocation that you chose is not positive proof that he is a rascal, an unscrupulous prevaricator, a man entirely unworthy of trust, as some narrow merchants seem to think. Do not do yourself nor your competitor the injustice to count as Bible truth every statement, however unreasonable, that may come from the professional shopper, but rather

Draw the Golden Rule

on him. Be as charitable toward him as you would expect him to be toward you. Think upon the reasonableness of the proposition and if you decide that it is not a reasonable thing for a sane man to do, nine times out of ten, he has deemed it unwise and would plead "not guilty." If you have been looking upon your competitor in this light, it is high time that you take a double dose of "familiar drops" and

Pay Your Competitor a Social Call

at his place of business. Talk with him as you would to a gentleman, and it will not require many minutes for you to learn that he is one. Talk with him as you would to an honest, upright, honorable business man, place some confidence in him, and you will find that he is worthy of it all, and that you have done him a grave injustice. Tell him some of your experiences, lay some of your unsolved problems before him and you will find that he has met and correctly solved many of them, and that he is ready to give you the benefit of his experience and advice. Rid yourself of petty jealousies, and feel a genuine interest in your competitor's welfare.

Sending Customers to Competitors Is Good Policy.

The man who can cheerfully direct his customers to his competitor for that which he does not handle not only confers a favor on his competitor, but renders a service to his customer, who will show his appreciation of unselfish service not only in expressed gratitude, but in a form which will prove a valuable asset that can be counted in the cash drawer. The happy man of to-day is the man who has done his neighbor a kindness. Gladden has truthfully said, "Men cannot cope successfully for any purpose if the sole bond between them is self-interest."

Telling Things.

The limit of the value of co-operation is dependent only on the extent of the co-operation itself. Tell your competitor that "Odom Moore" bought Hardware of you promising to pay in 30 days and that 15 months have elapsed and you have been unable to collect a penny of the account; you will find that he will reciprocate by telling you of many of his customers who are unworthy of trust. Tell him of the man who repeatedly comes to you with the statement that he can buy certain articles from him at unreasonable prices, and you will find that the same party has been going to him with similar statements regarding you.

Bitter Competion Ruins Both Sides.

The man who refuses to co-operate must, of necessity, to a degree at least, antagonize, and Hardware men are not angels. They are human, as other men, and there is a limit to their patience. When a good man has exhausted his patience in an honest effort toward mutually helpful co-operation and is continually met with antagonism proving a hopeless situation, he almost invariably turns and meets his antagonist in a deadly fight, the ultimate consequent result of which is the financial ruin of both. Let us open our eyes, and avoid paying the dear price of experience, with its high percentages of fatality.

Much to Be Accomplished.

By co-operation we learn to consider others, as well as ourselves, learn to appreciate and come to be appreciated. "In union there is strength," and by co-operation we cannot only influence local and State legislation, which will be profitable to us locally, but by thorough co-operation with all competitors we can effect the enactment of national laws which will greatly redound to the good of our country. We can also prevent the enactment of certain laws which are clearly detrimental to the best interests of the country at large and beneficial solely to a few master merchants. In short, in co-operation we have everything to gain with nothing to lose. Let us cry to those beyond and about us, "Hold high your lights and I may see my way," and to those below us, "Brothers, come on; come up." All the steps of human life are hard enough to climb when each shares his light and divides his neighbor's burdens. May God help us all to help one another.

Mutual Fire Insurance.

The subject of mutual fire insurance was brought up in the reading of a communication from W. P. Lewis, secretary of the National Hardware Mutual Fire Insurance Company, who was unable to be present. Mr. Lewis said that mutual fire insurance was superior, first, because of the theory or principle on which it operates, and, second, because actual operation has squared to the theory, completely demonstrating that this form of insurance is the best that the Hardware merchant can buy. He briefly described the plan and referring to the fact that the companies were organized for the benefit of the Hardware trade said:

These insurance companies were created by the Retail Hardware Association for the benefit of the Hardware trade. They are managed by men who are familiar with, in touch with, and loyal to the Hardware trade, and your money in these companies will bring you far larger profits than you are making on your Hardware business. These companies are growing stronger every year. They will ultimately reach the time when they can with safety carry all the insurance the Hardware trade will need and in doing it they will effect a saving of countless thousands of dollars. They are doing this now. An estimate of the money refunded the Hardware mutual policy holders is at present $100,000 annually. Alabama is entitled to participate, and, while it is the ambition of the officers of these companies that they shall grow to a state of power and dignity, yet the primary reason for their existence is that their influence shall be used for the development of the Hardware organization.

Marking Prices in Plain Figures.

Second Vice-President Rane McMillen, Demopolis, read a practical paper on the subject of "Why Not Mark All Goods in Plain Figures?" The paper was an argument in favor of plain marking, and was as follows:

In considering this subject or any subject in regard to the retail Hardware business it should at once be reduced to the simple question, will it increase the sales? The business is a selling proposition, and must be considered entirely on that basis.

Confidence of the public is the main thing to work for, and this can only be gained in one way, to conduct the business upon honest, straightforward methods, to have it recognized in the community that a child may be able to buy goods in your store as cheap and with the same satisfaction as could an expert of values.

Marking goods in plain figures interests the customer who, while waiting to purchase some special article, is often prompted to buy other things by being able to know the price. This is particularly noticeable during the holiday season, when shoppers are making selections which must necessarily be governed by the price.

Easier Choice.

The cost being plainly marked renders the matter of choice easier to the customer, and is of very great assistance to the salesman.

If you had reason to believe that your grocer, your shoe or dry goods dealer had two prices you would never know which one you paid, and you would often think it was the higher of the two. Do you know any good reason why it should be different with the buyer of Hardware?

The Merchant's Best Price?

Can you suggest any better way to send the would-be purchaser to your competitor's store, or cause him to send his money away to catalogue houses than to get the idea that he might not be getting the Hardware dealer's best price on a Cook Stove, Refrigerator, Lock or Tool, which he might chance to want or need to buy.

There is a price on every article at which more of the same goods can be sold to a better advantage than any other price, either higher or lower. The merchant should decide what that price should be, and when the decision is made it must be established in the store. Mark it in plain figures, put it in the show windows, the showcases and send it out in circulars.

Don't Be Afraid

of your competitor! He doubtless has *his* troubles, and you have quite enough in your own business to plan and devise the methods of increasing your trade.

The merchant should give convincing evidence of his own faith that his prices are right and his goods right.

A Store Motto.

There is no way by which he can more quickly and thoroughly establish this than to display prominently in his store the following motto: "Your money back if you want it—one price, and that price in plain figures." Practically all the large retail stores in the cities adopt this plan and find that it pays.

Some goods may be returned that ought not to be; competitors will cut some of your prices, but the balance at the end of the year will be found largely upon the profit side, and the annoyance you will have to contend with will serve to remind you not to expect perfection in the conduct of any business enterprise.

Manufacturers' Advertising on the Retailer's Behalf.

A paper on the subject of "What Kind of Advertising by the Manufacturer Benefits the Retailer to the Greatest Extent?" was read by C. A. Simpson, Troy. We give the following extracts from Mr. Simpson's address:

Advertising can be divided into a great many different classes. This is called a money age, but you have to advertise to get the business, and if it is properly handled, you will get the money. It is a broad subject, and covers every branch of business, from the smallest retailer to the largest wholesaler and manufacturer. They all advertise, and for the same purpose—to increase the sale of their wares.

Advertising Is Like Seed Sown.

it must have time to grow before you can reap the harvest. To cover the subject assigned to me, I have divided it into two parts—advertising for city trade, and advertising for country trade. I will treat first the city trade.

Magazine Advertising.

I have been very much impressed with the growth, system and kind of advertising the wholesaler and manufacturer are pursuing, especially their magazine advertising. I noticed in a magazine a few days ago that a certain manufacturer claims to have spent $1,000,000 in a year in advertising his products for the benefit of the retailer. No doubt every Hardware dealer present has received in the last few days sample copies of the advertising campaign that a certain Auger Bit Company has entered into. They have contracted with about 35 of the great national advertising mediums for big space advertising the entire year, some to cover center pages in magazines. The plan they have adopted, is in every respect for the benefit of the retailer. This advertising will bring thousands of inquiries from people all over the country, to each of which they propose sending a letter referring them to their local dealer. They also proposed giving souvenirs to those answering their advertisement, and the plan they have adopted in distributing these souvenirs alone is a great benefit to the retailer.

Beneficial Effects.

Some manufacturers advertise in magazines, periodicals, and newspapers, while some send out circulars and letters from a mailing list furnished by their retail agents, stating who handles their goods in their respective towns Jobbers advertise their private brand goods and trade mark. There will be a call at the local hardware store for some article that the factory advertises when possibly there has never been a piece of their goods sold in that territory. This causes the retailer to inquire into the merits of the article and the demand for it, and the result may be beneficial to all concerned.

Advertising for the Country Trade.

Circulars, booklets, pamphlets and newspaper advertising appeals very strongly to the country trade. With the rural routes and service that "Uncle Sam" has given us for the distribution of mail matter in the country we have a way to reach daily any person in the country. By this convenience there are thousands of circulars, booklets, &c., of different kinds sent out to the farmers and their wives. These people will read a circular letter carefully, and it will make a lasting impression on them. If this letter states what firm in town handles certain goods they will remember it better than people who live in larger places.

It Pays Manufacturers to Furnish Advertising Matter.

I was reecntly asked by a leading hardware journal if it paid the manufacturer to furnish the retailer with advertising matter. My answer in substance was that, judging by my own experience in handling this class of advertising matter, it has been very profitable, and I always appreciate anything of the kind that the jobbers and manufacturers send me. In order to secure the best results I sometimes distribute it by hand, and sometimes I use it as newspaper advertising. I often get good ideas from them and I think the jobbers and manufacturers would do the retailer as well as themselves a great injustice to discontinue the distribution of folders, booklets, etc.

National Delegate's Report.

L. G. Smith, secretary-treasurer of the association, who attended the meeting of the national organization at St. Louis in March, delivered an interesting and carefully prepared report of the proceedings, which was listened to with close attention.

Election of Officers.

The following officers were chosen for the ensuing year:

PRESIDENT, J. W. Beasley, Birmingham.
FIRST VICE-PRESIDENT, J. N. Cureton, Dothan.
SECOND VICE-PRESIDENT, J. R. Gamble, Wetumpka.
SECRETARY-TREASURER, L. G. Smith, Ensley.
EXECUTIVE COMMITTEE: F. M. Kelley, Selma, and C. A. Simpson, Troy.
DELEGATE TO NATIONAL CONVENTION, Rane McMillen, Demopolis

Resolutions.

Resolutions were adopted extending thanks to the Commercial Club for the use of its rooms and to Secretary Dowse for courtesies received; to M. L. Corey, national secretary, and J. D. Moore of the Moore & Handley Company, Birmingham, for interesting talks at the convention, and to the Birmingham jobbers for entertainment provided. A resolution was also adopted expressing the sympathy of the association with ex-President Luttrell in the illness in his family, which prevented his attendance at the convention.

CONTENTS.

Retirement of Samuel Disston.

IN the year 1850 Samuel Disston entered the employ of Henry Disston, Philadelphia, who at that time employed only about 35 men. He served his apprenticeship as a sawmaker, gaining a general knowledge of the business, and then entered the office. Subsequently, he became the road representative of the firm, traveling extensively, and becoming widely known. As a result, Mr. Disston is held in the highest esteem by the Hardware trade and others with whom he came in contact. The business of Henry Disston & Sons grew rapidly, and in the year 1894 Mr. Disston was made secretary and general manager of the company, which at the present time employs over 3500 men, its plant at Tacony covering over 50 acres. The company has branch houses at Chicago, Cincinnati, New Orleans, Memphis, Toronto, Nashville, Boston, San Francisco, as well as representatives in most of the large cities throughout the entire world. Advancing years and ill health have, however, made it impossible for Mr. Disston to give the close and undivided attention to business which had been his characteristic trait ever since his connection with it, and he has been compelled to realize that nature's demands must be heeded, and to announce his retirement from active duties and responsibilities connected with the management of this great industry.

SAMUEL DISSTON.

On Thursday evening last at the Bellevue-Stratford Hotel, Philadelphia, a complimentary dinner was tendered to him by the foremen and the old employees of Henry Disston & Sons, and a large number of experts in the different departments of the business representing both the manufacturing and commercial sides, were thus brought together. There was abundant evidence of the affection and honor in which Mr. Disston is held, in token of which a handsome loving cup was presented to him. While the trade throughout will regret Mr. Disston's withdrawal from the position which he has occupied for so many years, the duties of which have been transferred to others, they will recognize the appropriateness of his enjoying a much needed respite from the work to which he gave himself for so long a period and with such marked success. They will be glad to know while the active conduct of the business will devolve upon others thoroughly qualified to conserve and advance the great interests committed to them, that he will still, as the chairman of the Board of Directors, give to the corporation the benefit of his ripe experience.

In view of the retirement of Samuel Disston, the personnel of the management has undergone a change. The officers and directors now are as follows:

PRESIDENT, William Disston.
FIRST VICE-PRESIDENT, Henry Disston.
SECOND VICE-PRESIDENT, Robert J. Johnson.
TREASURER, Jacob S. Disston.
SECRETARY, William Miller.
ASSISTANT SECRETARY AND ASSISTANT TREASURER, E. B. Roberts
BOARD OF DIRECTORS: Samuel Disston, chairman; William Disston, Jacob S. Disston, Henry Disston, Robert J. Johnson, Frank Disston, Albert H. Disston, Henry C. Disston, William Miller, E. F. Cooper.

The broad foundation on which the business has been established will be strengthened wherever possible, and the high reputation achieved for the quality of Disston goods will be maintained in the future as in the past.

Minnesota Hardware Association.

THE Executive Committee of the Minnesota Retail Hardware Association held its quarterly meeting on the 28th ult., and fixed the dates for the next annual convention of the association. The time selected is February 23, 24, 25 and 26, 1909, at Minneapolis. The Minneapolis armory has been secured, and a Hardware exposition will be held in connection with the convention, as was the case last year.

The Retail Hardware Mutual Fire Insurance Company of Minnesota on the same date held its annual meeting, at which the following officers were chosen: Charles F. Ladner, St. Cloud, president; D. H. Evans, Tracy, vice-president; H. Hauser, Franklin, treasurer; M. S. Mathews, Guaranty Building, Minneapolis, secretary, and Thomas G. McCracken, assistant secretary. A very favorable financial statement was presented by Secretary Mathews, showing that losses were somewhat below the average, and expense ratio lower than for any previous quarter in the history of the company. The insurance in force on February 29, the date of the former report, amounted to $6,242,900, while on May 25 it had increased to $6,984,011.

Whitman & Barnes Mfg. Company's Catalogue.

THE WHITMAN & BARNES MFG. COMPANY, Chicago, Ill., has issued its general catalogue No. 68, containing about 325 pages, illustrating, listing and describing the extensive lines of goods which it manufactures. The company's product includes lines of interest to Hardware and Implement merchants alike, among which may be mentioned: Cutting Apparatus for Mowers and Harvesters, Diamond Haying Tools, Tubular Steel Frame and Wood Frame Grindstones, Lawn Mowers, Diamond Twist Drills and a complete line of Screw, Drop Forged and Bull Dog Wrenches. The value of the book to the trade is increased by the fact that it contains complete repair price-lists for the various lines.

Pittsburgh Steel Company's Chicago Offices.

THE PITTSBURGH STEEL COMPANY, with general offices in the Frick Building, Pittsburgh, works at Monessen and Glassport, Pa., manufacturer of Wire Rods, Wire Nails and other Wire products, also Hoops and Bands and Cotton Ties, has opened branch offices in the First National Bank Building, Chicago, in charge of R. D. Carver, Assistant General Sales Agent, and who for some years was secretary of the Southern Steel Company, Birmingham, Ala. Mr. Carver will handle the sales in the Chicago District, and with his long and favorable connection with the trade, will no doubt be able to secure his full share of the business offering.

THE NEW ENGLAND IRON AND HARDWARE ASSOCIATION met at dinner at Young's Hotel, Boston, May 26. At a short business session following the dinner a committee was appointed to make up a list of officers to be elected at the annual meeting to be held on Tuesday, 16th inst. President R. M. Boutwell presided, and the principal entertainment was an address by Hon. Henry M. Shute, author of "A Real Diary of a Real Boy." A quartette furnished music during the dinner and afterward.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

NORTH BROS. MFG. COMPANY, Philadelphia, Pa.: Handy pocket catalogue of Yankee Tools for 1908, including Ratchet Screwdrivers, Pocket Magazine Screwdrivers, Spiral Screwdrivers and Automatic Drills. The comparative size of the Tools is shown by excellent illustrations in groups, one-third actual size.

WINCHESTER REPEATING ARMS COMPANY, New Haven, Conn.: Illustrated catalogue No. 74, March, 1908, with price-lists of repeating Rifles, Carbines and Muskets, repeating Shotguns, single shot Rifles and Ammunition. Attention is called to several changes in list prices and additions to the line.

L. C. POND COMPANY, Los Angeles, Cal.: Illustrated circulars referring to various Hardware specialties, including Dew Drop, Wilgus, Sharpe Square and Thompson Lawn Sprinklers, Havil Lawn Weeders, Ellis Wood Smoother, Wood Folding Saw Vise, A. B. C. Vise, &c.

BUTLER BROS., Chicago: "Our Drummer" catalogue for June, 1908, refers to an extensive line of seasonable goods suitable for the Hardware trade, and quotes special prices. Several pages are devoted to Fireworks; also to "Resultful Plans," suggesting methods by which enterprising merchants may increase their business.

PRESSED STEEL TANK COMPANY, Milwaukee, Wis.: Catalogue, handsomely illustrated and got up, referring to Seamless Steel Barrels.

L. D. BERGER, Philadelphia: Pocket catalogue for 1908 illustrating and listing an extensive line of Sheet Metal Goods and roofers' and sheet metal workers' Tools and Supplies.

AMERICAN TOOL CHEST COMPANY, 200 West Houston street, New York: Illustrated 48-page catalogue, No. 20, with discount sheet No. 1, showing an exhaustive line of Tool Chests from mechanics' of the highest grade to the amateurs', youths' and children's Chests. They are listed both with the finest Tools and those more moderately priced, as well as for those of the toy variety. Empty Chests are also shown in all grades.

WHEELING CORRUGATING COMPANY, Wheeling, W. Va., Chicago branch house: General catalogue No. 265, with accompanying net price-list No. 1, referring to the company's extensive line of sheet metal products, including Conductor Pipe, &c., Metal Shingles, Metal Ceilings, Roofings, Sidings, Galvanized Ware, &c.

Requests for Catalogues, Etc.

The trade is given an opportunity in this column to request from manufacturers price lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM UEHLING HARDWARE, Uehling, Neb., which handles Shelf and Heavy Hardware, Stoves, Paints, Sporting Goods, Harness, &c.

FROM GEO. B. MAIN COMPANY, 70 Warren street, New York, which has been incorporated to handle Hardware, Agricultural Implements, &c., as manufacturers' agent. The incorporators are G. B. Main, I. T. Freye and Thos. Kilvert.

FROM T. G. POSTANS COMPANY, which has bought out the Hardware, Stove, Paint and Sporting Goods business of T. J. Lindsay & Co., Bellevue, Pa.

Edward T. Tichacek has purchased the business of Frank A. Bouzek in Linwood, Neb., and will handle Shelf Hardware, Stoves, Tinware, Paints, Oils and Sporting Goods.

LETTERS FROM THE TRADE.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Manufacturers' Sales to Retailers and Consumers.

To the Editor: Referring to the article in a recent issue of *The Iron Age* as to manufacturers selling to retailers, I find a great difference of opinion among manufacturers as well as jobbers and retailers as to what differences should be made in prices. Suppose a manufacturer's discount to jobbers is, say, 50 and 5 and 5 per cent., what discounts should the large retailer receive, also what would be the proper discount to the smaller retailer and large consumer?

I usually make prices so as to allow a profit to each of about 10 per cent., which at a bottom of 50 and 5 and 5 per cent. would make the other discounts about 50, 45 and 40 per cent., respectively.

An expression of opinion on these points from those interested might lead to some uniformity of action.

MANUFACTURER.

AMONG THE HARDWARE TRADE.

The Coweta Hardware Company, Coweta, Okla., has been organized and incorporated with a capital stock of $5000, the incorporators being R. W. Lumpkin, C. E. Trumbo and C. K. Leslie.

The Atoka Hardware Company, Atoka, Okla., has been incorporated with a capital stock of $10,000, to deal in Shelf and Heavy Hardware, Stoves, Implements, Vehicles and Plumbing Goods.

G. T. Falk, Foley, Minn., is building an addition to his store. He handles Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Sporting Goods, Buggies and Wagons.

W. C. Cameron has purchased the stock of McDougal Bros., Tecumseh, Neb., and will handle Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils and Sporting Goods.

Sam. M. Biddison has purchased the Hardware stock of Gibson & Miller, Americus, Kan., while the firm retains the Implement department of the business.

W. W. Nixon has purchased the business of W. J. Martin in Barada, Neb., and will handle Shelf and Heavy Hardware, Paints, Oils, Sporting and Athletic Goods.

The Hardware and Furniture store of W. Floyd, Vergennes, Ill., has been destroyed by fire, entailing a loss of $5500, which was partially covered by insurance.

The Clarke & Eaton Company has sold its property in Elberton, Wash., and established a Hardware, Implement and Plumbing business at Endicott, Wash.

W. B. MILLER & SON, Springfield, Ill., completed a half century in the retail business in April. The house is the second oldest retail concern in that city. The business was started by W. B. Miller in 1858, and was continued by him for a period of 30 years. On the death of Mr. Miller the business passed into the hands of L. S. Miller, his son, and W. C. Starck, the former having been identified with it for 25 years and the latter for two years longer. To commemorate the beginning of a new half century the firm has inaugurated a number of special sales. These sales are for cash only, and purchasers have been limited to one item at a visit. The first special sale covered the period from Monday, May 18, to Saturday, May 23, and included a well-known make of Food Choppers and family Scales, the prices on which were made exceptionally attractive and considerably below the regular quotations on the goods.

Trade Items.

THE GEORGE B. MAIN COMPANY, 70 Warren street, New York, is the title of a new house just organized by George B. Main, as direct factory representative of Hardware manufacturers to the jobbing trade. Mr. Main has been in this line of business for over 25 years, having recently severed his connection with the Lockwood Company. Associated with him are William G. Van Ness, secretary and treasurer, and Ira T. Freye, vice-president. All of the principals are well known in the Hardware trade, and have worked together in the same company for years.

THE AMERICAN FILE SHARPENER COMPANY, manufacturer of a machine for resharpening used Files, the Hercules Steel Link Folding Ladder and the "Best" File Handle, has removed from 296 Broadway to new quarters at No. 287 Broadway, New York.

THE GRIFFIN MFG. COMPANY, Erie, Pa., manufacturer of Wrought Steel Butts and Hinges, Steel Shelf Brackets and miscellaneous Hardware, has made arrangements with Benjamin S. Alder Company, 37 Warren street, New York, to act as its selling representatives in New York City and for export. J. M. Cole, who has traveled for the Griffin Mfg. Company for some years, becomes associated with B. S. Alder Company and will give special attention to the export department.

THE CONNEAUT SHOVEL COMPANY, Conneaut, Ohio, has recently established agencies in the South with J. E. Lastrapes, New Orleans, La., and Atlanta Mills Supply Company, Atlanta, Ga. The company has been getting an increasing business from this section and the new agents will maintain stocks to take care of the trade.

C. T. BRACE, who is well known to the trade from his connection for many years with the former Paddock-Hawley Iron Company, St. Louis, and later as vice-president of the Beck & Corbitt Iron Company, St. Louis, is no longer identified with the Heavy Hardware business. Mr. Brace has become secretary of the Reuter Hub & Spoke Company, with general office at Dexter, Mo., an old established wood stock concern, which is operating in an excellent hardwood timber district. The company, in addition to the plant at Dexter, also operates factories at Marianna and Batesville, Ark.

THE CHANDLER & FARQUHAR COMPANY, Boston, gave its annual banquet for the Chandler & Farquhar Association, the organization of its employees, at the American House, May 21. Dinner followed an informal reception, and afterwards there was speaking, President Charles S. Farquhar of the corporation presiding. Those who spoke included Robert J. Lynde, F. Alexander Chandler and W. N. Schofield of the company, and R. M. Jones, M. D. Farnum, W. A. Dow, R. R. Somes and others of the sales force. The remarks developed valuable points of interest, information and instruction. The members of the association provided an interesting programme of entertainment.

THE Hardware merchants of Springfield, Ill., have organized a local association and elected the following officers: Lewis S. Miller, president; L. C. Mathies, vice-president; Fred P. Schlitt, secretary; Charles H. Robinson, treasurer. Springfield was chosen as the meeting place of the next annual convention of the Illinois Retail Hardware Association in February, 1909, and the necessity for co-operation of local merchants in perfecting suitable arrangements for the entertainment of the convention resulted in the long contemplated formation of a local association. One of the first official acts of the new association was the confirmation of the appointment by the Chamber of Commerce of the following committee, to have charge of the State Convention, which will be held in the Armory Building: Charles W. Zumbrook, Fred P. Schlitt, and Charles H. Robinson.

REFERENCE has already been made to the fire which a few weeks since destroyed the Hardware stock and building of the John S. Menagh Company, Jersey City, N. J. The structure, which had entrances on Newark avenue and Grove street, and was owned by Mr. Menagh, will be rebuilt. The Newark avenue end, however, will be rented, Mr. Menagh continuing the business in the Grove street portion, which will provide a total floor space of 13,500 sq. ft. Mr. Menagh is temporarily located at 191 Morgan street, where he is taking care of his trade as far as possible.

WILLIAM G. FISHER, Fitchburg, Mass., assistant secretary of the Simonds Mfg. Company, and sales manager for the Fitchburg, Mass., office, died May 13, aged 28 years. He was a native of Brattleboro, Vt., and after leaving the high school entered the employ of the company as a clerk. His marked ability lead to rapid promotion to positions of responsibility and trust. He was prominent as a Mason and was a Knight Templar. He leaves a widow, a son and a daughter.

HARDWARE MERCHANTS' ADVERTISING

THE advertisement reproduced herewith comes from the W. S. Thomson Hardware Company, Craig, Mo. It occupied a double column space, 5 in. high. It will be observed that it draws attention in an attractive way to

A Missouri Firm's Advertisement.—Actual Size, 4½ x 5 In.

the subject of incubators and poultry netting. The wording is good and also the typographical arrangement. For the benefit of those in remote parts of the territory covered by the company it would have been well to have coupled the location with the name of the house.

THE J. M. THOMPSON & SONS HARDWARE COMPANY, Owatonna, Minn., has recently distributed among the farmers in territory tributary to Owatonna a yellow covered catalogue of 32 large pages, which is referred to as the company's "Hardware Catalogue." It covers a varied line of merchandise, including Roofing, Paints, Enameled Ware, Galvanized Iron Ware, Hay Tools, Locks, Mechanics' Tools, Separators, Wire Fencing, Gasoline Stoves, Cutlery, Guns, Sewing Machines, Buggies, &c. Reference is made to the company's "Great 5 and 10 cent Counter," which is said to be "the best place in town to seek bargains in small wares." It is remarked that the display of these goods is changed every two weeks, so that visitors are always pretty sure to find something new and interesting in this department.

On the front cover of the catalogue appear the following statements indicating the policy of the store and its guarantee:

OUR POLICY

is to give you the best possible selection of Hardware at the lowest possible price, quality considered. We guarantee to meet any price on any article of Hardware in any catalogue. Price for price, grade for grade, freight considered.

GUARANTEE.

If you purchase anything from us that does not please you in every way we will take it back without any argument and return your money or give you goods of equal value. Just as you wish. We do to others as we wish to be done by.

The company sells for cash only, which is referred to as permitting it to sell goods at a closer margin than on the credit basis.

McNEILL, SCHLOSSER & CO., have engaged in business in Olympia, Wash., and are handling Shelf Hardware, Stoves, Tinware, Sporting Goods, Lime and Cement. They also do plumbing and heating.

Peerless Flexible Bit Gauge.

Sargent & Co., New Haven, Conn., and New York, are putting on the market Sargent's Peerless flexible bit gauge, patent applied for, here illustrated. It can be used in connection with the various sizes of auger bits, twist drills, &c., the single thumb screw holding the gauge securely in position and accurately gauging a hole of any depth to within ¾ in. of the brace chuck. The gauge proper, 5¼ x ¼ in., is made of spring steel wire, and every part is polished and nickeled. The gauge is flexible, owing to its spiral or spring like character, there being 20 turns to the inch, and from the nature of its construction will not mark the wood, slip upwards or interfere with the chips. There is a six turn spiral steel expansion spring around the screw with thumb nut, which causes the two polished wrought steel clamps that grip both gauge and bit shank to expand automatically in attaching to auger bit. The gauges are put up 12 in a box.

Sargent's Peerless Flexible Bit Gauge Attached to Shank.

Wire Hooks and Hangers.

The coat and hat hook and the folding garment hanger, shown herewith, are manufactured by the Wire Goods Company, Worcester, Mass. The coat and hat hook illustrated in Fig. 1 is made of No. 9 wire, is 5½ in. long over all, and is furnished in the following finishes: Coppered, japanned, chestnut bronzed, retinned, brass and nickel plated. The hook is recommended for use in hotels, barber shops, railway stations, &c., as it is claimed that there is no chance of a hat being knocked from the hook. The garment hanger, Fig. 2, is made of steel wire, retinned. A feature of the device is the interlocking of the double wires.

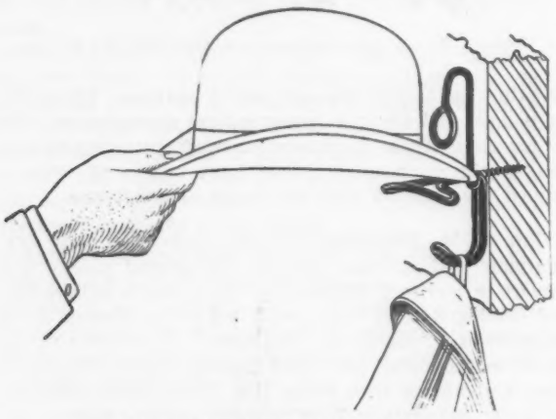


Fig. 1.—Star Coat and Hat Hook.

Fig. 2.—Traveler Folding Garment Hanger No. 49.

McConchie Bros. have purchased the business of Geo. F. Poor, Frankfort, Kan., and will handle Shelf Hardware, Stoves, Tinware, Paints, Oils and Sporting Goods. Furnace work and plumbing will also be carried on by the new proprietors.

The Bradley Metal Clasp Ceiling Hook.

An improvement has been made in the ceiling hook of the Atlas Mfg. Company, New Haven, Conn., as shown herewith. The hook has full parallel wires made from a single strand, one end of which is carried through the metal clasp and threaded. The arms of the hook are brought together with a curve, which makes the lines more pleasing to the eye. The clasp forms a base with ample bearing, and binds the wires together at this point so firmly as to prevent working and weaving of the wires. The thread on the hook has been improved, and the pull down from the garment is more nearly in line with the screw.

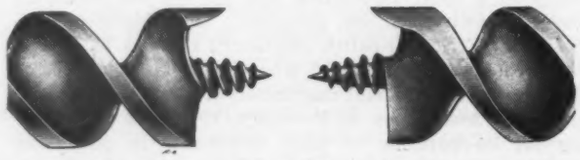
The Bradley Metal Clasp Ceiling Hook.

Hampden Machine Screw Company.

The Hampden Machine Screw Company, Springfield Mass., will devote practically all its facilities to the manufacture of specialties and automatic screw machine products. The company does not make standard screws of any kind, but is prepared to turn out special machine screws if wanted. It is the belief of the company that there is a large field for a concern supplying strictly high grade work of this class at reasonable prices, and states that the quality of its output will be as near right as experienced mechanics and good equipment can make it. A plant is being installed for nickel plating, lacquering, galvanizing, and all kinds of metal coloring, and the company is also prepared to do case hardening, designing and model building.

Red Devil Auger Bit.

The Smith & Hemenway Company, 108-110 Duane street, New York, as selling agent for W. A. Ives Mfg. Company, Wallingford, Conn., is introducing the Red Devil razor edge auger bit here illustrated. It is made of a high grade of English tool steel, and finished from tip to tip. The pitch of the thread and pitch of worm, it is said, work in harmony, so that there is no backing up in either hard or soft wood boring across the grain or with it. It is easy to sharpen the cutting members because the lip is on the side opposite the scorer, so that it may be whetted with an oil stone. The assertion is also made that this form of construction insures the boring of a straight hole. The bit is said to bore in any direction in hard wood, including a diagonal in quartered oak. It engages the wood at a point nearest the screw or fulcrum, working its way out to the scorer, thus preventing the thread from disengaging the wood, backing up or the



Two Views of the Red Devil Auger Bit.

wood clogging in the worm. The manufacturer recommends the bit for boring in either hard or soft wood. It is made in all sizes from 4 to 16-16, inclusive, with square shank for brace chuck.

The Sloan Kitchen Utensils.

Three utensils included in the line of kitchen specialties made by the Sloan Mfg. Company, 2120 Broadway, Kansas City, Mo., are shown in the accompanying illustrations. Fig. 1 represents the Sloan oven, which is designed for use on gas, gasoline or oil stoves, and is claimed to be not only of great convenience, but also an economizer of fuel for cooking. The base consists of a supporting shelf upon which the articles to be baked are placed; the shelf being provided with a conical heat distributor underneath, which spreads the heat evenly over the bottom of the perforated baking shelf. A removable shelf is provided, to be placed above the first, so that two articles, such as biscuits, pies or cake, can be baked at the same time. The interior arrangement is clearly shown in the cutaway section. The round form of the heat retainer or hood contributes to the maintenance of an even temperature in every part of the oven. In addition to its utility as a baking oven the hood is recommended as a fuel saver in heating sad irons, as it retains much of the heat that would otherwise be dissipated. It is light enough to be easily lifted by one hand, and can be easily used for this purpose. The oven is large enough to accommodate a chicken or roast weighing as much as 7 lb., and it is claimed by means of the conical top, evaporating juices are precipitated on the roast, thus basting it automatically. The oven is furnished with two biscuit pans and a round dripping or roasting pan, suitable for baking puddings, &c. Fig. 2 illustrates the Sloan toaster and stove mat. The chief feature of the device is the conical sheet iron heat distributer set underneath the wire netting to prevent the concentration of heat upon the center of the utensil. All of the toasting surface, 10½ in. in diameter, is equally available and effective for toasting, and gives room for six ordinary slices of bread at a time, which, it is claimed, can be toasted in 2 or 3 min. Used as a stove mat it is placed under a stewing pan, skillet or griddle, the bottom of which being subject to an even heat over its whole surface minimizes the damage of burning food. Fig. 3 illustrates the Sloan water cooling can. It is made of galvanized sheet iron, and is 1⅞ in. thick by 10½ in. long, and of a shape and size that adapts it to storage in the ice or cooling compartments of refrigerators. It is furnished with an air tight stopper, so that the water does not come in contact with odors arising from other contents of the refrigerator. Its convenience in providing cool drinking water will be readily appreciated. It is made in three sizes, holding ½ gal., 3 quarts and 1 gal., respectively.

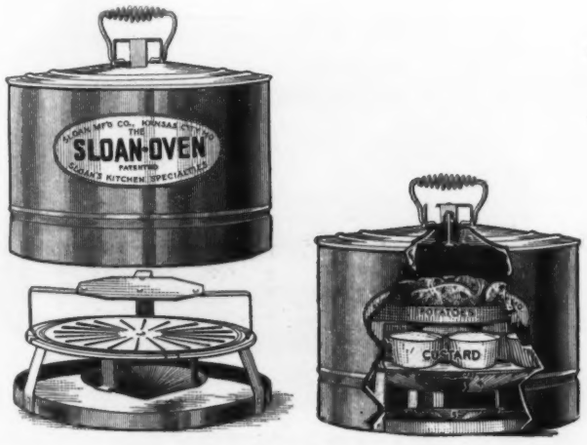


Fig. 1.—The Sloan Oven.

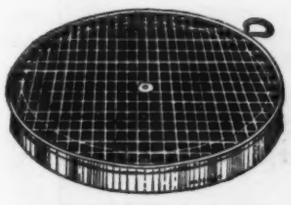


Fig 2.—The Sloan Toaster and Stove Mat.

Fig 3.—The Sloan Cooling Can.

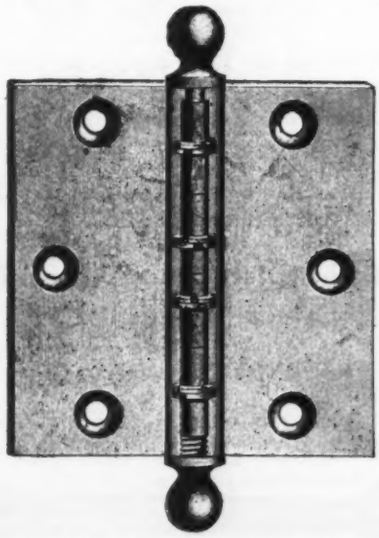
The Pierce Lawn Trimmer.

The advantages of the lawn trimmer, here illustrated, will be readily appreciated by those who have had the care of lawns. It is made by the Northwestern Consolidated Iron & Steel Mfg. Company, Burlington, Iowa, which recommend it as an efficient and acceptable substitute for hand shears or sickle commonly used to trim the grass along sidewalks, fences, buildings, flower beds, borders, and other places inaccessible to lawn mowers. The blades of the tool are made of high grade crucible steel, oil tempered, and carefully ground. The frames to which they are attached are of malleable iron. Suitable 4-ft. wooden handles are bolted to the frames, the implement being designed to cut with an ordinary shear motion. It is supported in position for cutting by a wooden roller set underneath the frame, the effect of which is to give it a steady even motion. In handling the trimmer the operator stands erect and is spared the fatigue of stooping or kneeling. The tool is provided with ball bearings, is neatly painted and striped, and comes packed in ¼ doz. boxes.

The Pierce Lawn Trimmer.

Wrought Loose Pin Butt.

The Russell & Erwin Mfg. Company, New Britain, Conn., and 94-98 Lafayette street, New York City, has added to its line the wrought loose pin butt here shown, which is furnished in both bronze metal and steel. The butt is of the regular type with the added feature that the knuckles are lined throughout the entire length with hardened steel bushings as indicated in the illustration. The butt is therefore recommended as combining the tensile strength of wrought metal with the extra wearing qualities of hardened steel bushings.



Wrought Loose Pin Butt.

Gem Adjustable Cap with Dayton Swing Top and Hood.

The Kramer Bros., Foundry Company, Dayton, Ohio, is placing on the market a combination adjustable cap with swing top and hood, illustrated herewith. The company claims that the device embodies both economy and convenience, as it prevents waste of time in measuring up

Fig. 1.—Adjustable Cap.

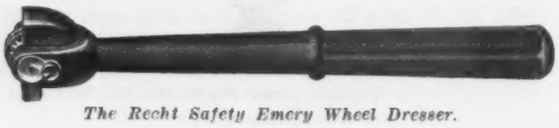
sizes of flues for the base of galvanized stacks and other measurements. The collar of the chimney cap has an adjustment up to 6 in., and is bolted onto the main stack of pipe. The swing top is riveted in turn to the top of the pipe and hood, all of which are punched with necessary holes and shipped knocked down. It is stated that a combination is thus provided which enables the filling of any order for any size of chimney quickly and more

Fig. 2.—Swing Top and Hood.

economically than by older methods, and that in addition, when the stack proper wears or rusts out a new pipe is readily put in place by the removal of bolts and rivets. It is remarked that as the parts are made of gray iron they will last indefinitely.

The Recht Safety Emery Wheel Dresser.

Jas. L. Neefus, 103 Chambers street, New York, is placing on the market the safety emery wheel dresser illustrated herewith, manufactured by Frederick Recht, also of this city. The dresser is referred to as differing from the Huntington only in the addition of a safety hood. This is designed to protect the operator in case of



The Recht Safety Emery Wheel Dresser.

accident to the dresser wheels, and also to prevent fine particles of emery being thrown into the face and eyes of the operator. The handle is made of the best malleable iron with hardened steel bushings and pin, while the dresser wheels are alluded to as of the best quality tool steel hardened to the proper temper. The handles are finished in bright vermilion, and the tools are packed one in a box, with an extra set of dresser wheels.

The Westinghouse Electric Tailors' Goose.

To meet the demand upon the part of manufacturing and custom tailors for an iron embodying the same principles as the Westinghouse electrically heated sad iron, the Westinghouse Electric & Mfg. Company, Pittsburgh, has brought out the goose shown in the illustrations. This is designed to endure the same rough usage as the plain cast iron goose and to fulfill all the requirements of the tailor with the elimination of the heat, dirt and inconvenience incident to other methods. It is made in two shapes, wide and narrow. The wide goose, Fig. 1, is

Fig. 1.—Wide Electric Tailors' Goose.

5½ x 8½ in., and comes in four different weights, 12, 15, 18 and 22 lb. The narrow goose, Fig. 2, is 3 x 10 in., and is furnished in three different weights, 12, 15 and 18 lb. Both types are made for three different voltage ranges, 100-107, 108-115 and 116-125. In order to avoid complication, a single heat alone is provided, which is sufficient to rapidly bring the iron to a working temperature and to maintain it uniformly during the heaviest service. On intermittent or light work the current can be turned off a considerable portion of the time, and the irons are constructed so that their working surface will remain hot a long time, after the iron has been thoroughly heated. The heating element is a thin steel grid, arranged to distribute the heat evenly over the entire working sur-

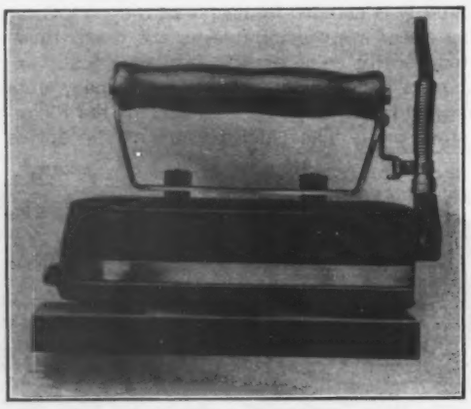


Fig. 2.—Narrow Electric Tailors' Goose.

face of the iron. The grid is hermetically sealed within a fireproof dielectric of good thermal conductivity, and is held between two solid iron blocks, one of which forms the working surface of the iron, the other, immediately above it, serving as a heat reservoir or thermal equalizer by which the constant input of heat from the heating element is stored up and given out to suit the irregular demands of the work. These two portions of the iron are solidly secured together, and in effect form a solid mass which is separated from the top of the iron by means of an air space which forms an effective heat insulator.

Liberty Cold Blast Lantern No. 553/2.

The accompanying illustration, Fig. 1, represents a new lantern put on the market by the Simmons Hardware Company, St. Louis, Mo. The brass burners with which the lanterns are equipped have a slot in the cone, which is brought to a point at each end to make the light burn wide and bright. The burner is fastened to the fount by a double bayonet lock on the burner cone, and, in addition, by a protruding arm which covers the wick raiser. This latter acts also as a lock and prevents the wick dropping into the fount. The lanterns are fitted with patented bails, which will stay in any position in which they are placed. The holdfast lever catch is made in such a way as to do its work, of raising the globe for lighting, quickly

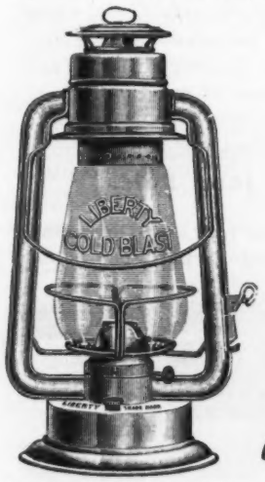


Fig. 1.—Liberty Cold Blast Lantern No. 553/2.

Fig. 2.—Liberty Lantern Tag.

and accurately. Wicks are fitted in the burners of each lantern, and the globes are of clear lead flint glass. All founts are air tested by air under water before they leave the factory, and are guaranteed to be oil tight. The lantern illustrated is covered with a bright maroon bicycle enamel, baked on in the same manner as the enamel is put on a bicycle. This is referred to as a most durable finish that will not scratch or come off easily like paint, and also serves as a protection against dampness, and will outwear plain lanterns on that account. In addition to cold blast lanterns, the Liberty line is made in full nickel plated, old copper finish and blue japan, with and without dashboard attachment and bull's-eye globes. Each lantern has a little bell shaped tag, Fig. 2, showing the number and suggested retail selling price, and enumerating some of the points of excellence.

The Insulated Wire Grip.

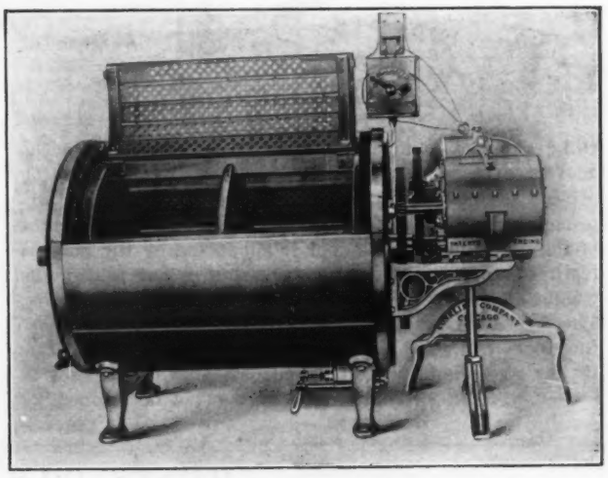
To meet the demand for a grip that will handle insulated wire without injury to the covering, Mathias Klein & Sons, 87-89 West Van Buren street, Chicago, have designed and are offering a new grip which is here illustrated. The principal object sought was to provide a tool that would effectively grip and hold insulated wire without subjecting it to the rough treatment incident to the use of ordinary bare grips. To accomplish this the gripping surface of the jaws is provided with a series of serrations, so arranged that while they tightly grip

The Insulated Wire Grip.

the wire they do not cut the insulation. The entire tool is made of steel, the lever and body piece being drop steel forgings; this feature of construction gives the grip standing up qualities that guard against buckling under strain. The draw link is so arranged that it will not fall in the way of the wire when the grip is placed in position. The size now ready for the market is suitable for handling No. 4 and smaller insulated wire and larger sizes are in process of manufacture.

Motor Driven Laundry Washer.

The laundry washer here illustrated represents one of the latest type motor driven machines made by the Conkling Company, Ninety-sixth street and Erie avenue, Chicago, Ill. It embodies several important features of improvement, the chief of which is the automatic reversing mechanism by which the motion of the cylinder is reversed at regular intervals. The device, shown at the right in the illustration, is gear connected to a Westinghouse motor, and consists of a unique arrangement of friction clutches, whose operation is controlled by suitable gears which run in oil in a tightly inclosed case. This mechanism together with the motor is mounted on cast iron brackets supported by a central pillar post, which form a firm foundation, reducing vibration to a minimum. The cylinder dimensions of the washer are 36 x 48 in. inside measurement, and it has a holding capacity of 200 shirts or their equivalent in other goods. The cylinder staves are perforated with over 2100 ¾-in. holes, and are prevented from swelling out of alignment by dowel pin connections. The hoops, which are ⅛ x 1¾ in. wide, together with all hinges, rings and catches, are of brass, and the flange hinges are made to rest ½ in. upon the hoops, through the entire length of the hinges, thus adding materially to the strength of construction and the tight closure of the cylinder. The shell is made with heavy iron ends, to which are bolted 2-in. staves of long leaf yellow pine, and it has a one-piece brass protecting

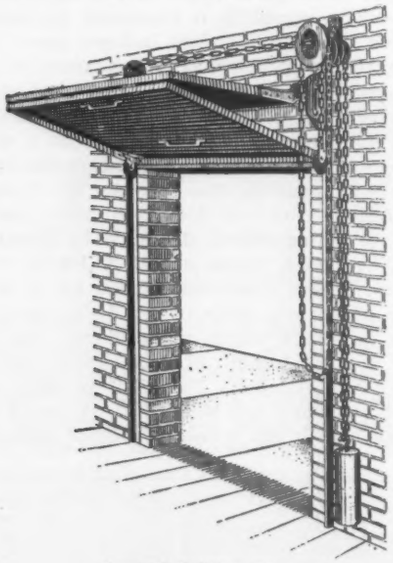


Motor Driven Laundry Washer.

apron 18 in. wide, turned up at the bottom to prevent drippings running under the shell. The cylinder is closed by a sliding door of galvanized iron fitted with brass knobs, which being set equi-distant from the edges, balance the lift so that the door is kept from binding while sliding in its bearing. Quick and uniform heating of the water is accomplished by a perforated steam pipe which traverses the bottom of the cylinder partially incased in an iron stave running the full length of the machine, which also serves as a drain. A water inlet connection is provided at either end of the washer by means of a slotted stave, and the outlet valve is made in one piece with the washer leg and is arranged to be operated by a foot lever. The difficulty of articles dropping between the cylinder and shell in loading is overcome by a provision that admits the insertion of a wire through the opening of the gauge glass holder to the outlet valve; the necessity for taking the machine apart for this purpose is thus obviated. The gauge glass being open at the top allows all lint and ravelings to run out, and the tube may thus be cleaned without removing it from its place by taking off the bronze cap covering. It is claimed the equal cylinder reverses provided by the automatic mechanism prevents packing of the clothes and keeps them in loose condition; also that the close proximity of the shell and cylinder and the elimination of the usual long waste pipe result in a saving of soap and water.

The Erwood Folding Door No. 3.

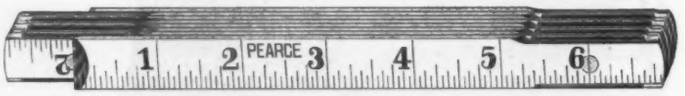
A new folding door designed to meet the requirements of convenience, security, durability and ease of operation has just been brought out by the Union Drop Forge Company, 67 and 69 Indiana street, Chicago, Ill. The device is referred to as simple in construction, positive in action and embodying what are claimed to be distinctive features of improvement. The door consists of two leaves hinged together, and is hung at the top on segmental racks fastened to the wall or building projecting from the radial centers of the segmental gears are trunion bolts which, as the door is folded, travel upward in machine guideways cut in the rack frame upon which the gears travel or roll. As the door is lifted the folding process progresses until the rollers on the lower leaf approach the lower ends of the rack frame. The weight of the upper half of the door is supported by the meshed teeth of the segments and rack, but when folded the weight of the overhang is sustained by the trunion bolts. The strength thus provided is ample not only to support the door itself, but additional weight if required. Particular stress is laid upon the adjustability of the door to the changes in sill hights that are often occasioned by the accumulation of dirt or by wear, settlement or shrinkage. If from any of these causes the bottom of the door is prevented from resting evenly on the sill, the adjustment necessary to keep the door in perpendicular alignment can be made by slightly rotating the segmental gears on the trunion bolts by means of set screws; the door can thus be raised or lowered as conditions demand without the necessity of taking it down or rehanging. Another feature of originality is claimed in the provision made for the prevention of overfolding. This is accomplished by the flexible arrangement of trunion bolts which permits the top leaf to travel away from the lower one as the door is folded, thus leaving, when drawn up, proper clearance between the upper and lower points upon which the entire structure is carried; it also permits a door of given hight to be closely folded in a limited radius. Differential gears and a balancing counterweight combine to make the opening and closing of the door a positive and easy operation. The doors are made of wood or iron, or both, and when raised leave an unobstructed doorway.



Erwood Folding Door No. 3.

The Pearce Spring Joint Rule.

To meet a demand for something in the line of flexible folding rules cheaper than its Flexifold rules, the Chapin-Stephens Company, Pine Meadow, Conn., has recently put on the market a line of spring joint rules, as illustrated herewith. These are alluded to as being cheap in price only as they are well made and well finished, having well constructed joints and are protected by metal tips the same as the company's higher grade of rules, but not quite so highly finished. The Pearce line is made at present in yellow enamel only, in lengths of 2, 3, 4, 5, 6 and 8 ft., packed one dozen in a box.



The Pearce Spring Joint Rule.

C. F. Jackson, Norwalk, Ohio, has decided to add a complete line of Hardware, Tools, Stoves, House Furnishing Goods, Paints, Harness, &c., and will at once begin the erection of a two-story brick building, 60 x 76 ft., for the accommodation of this department.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal.	
Linseed, State and Western, raw	.42	@44
City, Boiled	.45	@46
City, Raw	.44	@45
Raw, Calcutta, in bbls.	.70	@..
Lard, Prime, Winter	.62	@64
Extra No. 1	.54	@56
No. 1	.47	@52
Cotton-seed, Crude, f.o.b. mill		@..
Summer Yellow, prime	.47½	@48
Summer White	.49	@49½
Yellow Winter	.49	@49½
Tallow, Acidless	.52	@55
Menhaden, Brown, Strained	.40	@..
Light Strained	.40	@..
Bleached Winter	.42	@..
Ex. Bleached Winter	.44	@..
Cocoanut, Ceylon	℔ lb 6¼	@ 6¼
Cochin	℔ lb 7	@ 7¼
Cod, Domestic, Prime	.42	@44
Newfoundland	.44	@46
Red, Elaine	.37½	@39
Saponified	℔ lb 5¼	@ 5½
Olive, Yellow	.67	@69
Neatsfoot, Prime	.55	@58
Palm, Lagos	℔ lb 5½	@ 5⅝

Mineral Oils—

	℔ gal.	
Black, 29 gravity, 25@30 cold test	.13	@13½
29 gravity, 15 cold test	.13¼	@14
Summer	.12½	@13
Cylinder, light filtered	.20½	@21
Dark, filtered	.18	@19
Paraffine, 903-907 sp. gravity	.14½	@15
903 sp. gravity	.13½	@14
883 sp. gravity	.11	@11½
Red	.13½	@14

Miscellaneous—

Barytes:		
White, Foreign	℔ ton	$18.50@20.50
Amer., floated	℔ ton	18.00@20.00
Off color	℔ ton	13.00@16.50
Chalk, in bulk	℔ ton	3.00@ 3.40
China Clay, Imported	℔ ton	11.50@18.00
Cobalt, Oxide	℔ 100 lb	1.45@ 2.60
Whiting, Commercial	℔ 100 lb	.42@ .52
Gilders	℔ 100 lb	.55@ .60
Ex. Gilders	℔ 100 lb	.60@ .65

Putty, Commercial—℔ 100 lb

In bladders	$1.70	@1.80
In bbls. or tubs	1.20	@1.45
In 1 lb to 5 lb cans	2.65	@2.95
In 12½ to 50 lb cans	1.50	@1.90

Spirits Turpentine—℔ gal.

In Oil bbls.	.43½	@44
In machine bbls.	.44	@45

Glue—

	℔ lb	
Cabinet	.12	@15
Common Bone	.7½	@ 9
Extra White	.18	@24
Fish, liquid, 50 gal. bbls., per gallon	.60	@1.20
Foot Stock, White	.12	@14
Foot Stock, Brown	.9	@11
German Common Hide	.10	@12
German Hide	.12	@18
French	.10	@40
Irish	.13	@16
Low Grade	.10	@12
Medium White	.14	@17

Gum Shellac—

	℔ lb	
Bleached, Commercial	.20	@22
Bone Dry	.25	@27
Button	.30	@40
Diamond I	.47	@ 8
Fine Orange	.29	@32
A. C. Garnet	.23	@24
G. A. L.	.18	@19
Kala Button	.17	@ 8
D. C.	.48	@49
Octagon B.	.38	@40
T. N.	.25	@26
V. S. O.	.47	@48

Colors in Oil—

	℔ lb	
Black, Lampblack	.12	@14
Blue, Chinese	.36	@46
Blue, Prussian	.32	@36
Blue, Ultramarine	.13	@16
Brown, Vandyke	.11	@14
Green, Chrome	.12	@16
Green, Paris		@24
Sienna, Raw	.12	@15
Sienna, Burnt	.12	@15
Umber, Raw	.11	@14
Umber, Burnt	.11	@14

White Lead, Zinc, &c.—

	℔ lb	
Lead, English white, in Oil	.10½	@10⅝
Lead, American White:		
Lots of 500 lb or over, in Oil		@ 6¾
Lots less than 500 lb, in Oil		@ 7¼
Lead, White, in oil, 25 lb tin pails		@ 7¼
Lead, White, in oil, 12½ lb tin pails		@ 7⅝
Lead, White, in oil, 1 to 5 lb assorted tins		@ 8¾

Lead, American. Terms: On lots of 500 lbs and over 2% for cash if paid in 15 days from date of invoice.

Zinc, Dry—

	℔ lb	
American, dry	5½	@ 5⅝
Red Seal (French process)	6¾	@ 7
Green Seal (French process)	7¼	@ 7½
German Red Seal (French process)	6½	@ 6⅞
Green Seal	7¼	@ 7½
White Seal	7⅞	@ 8⅛
French, Red Seal	8¼	@ 8¾
Green Seal	10¼	@10¾

Dry Colors—

	℔ lb	
Black, Carbon	.6½	@10
Black Drop, American	.3½	@ 8
Black Drop, English	.5	@15
Black, Ivory	.16	@20
Lamp, commercial	.4	@ 6
Blue, Celestial	.4	@ 6
Blue, Chinese	.31	@33
Blue, Prussian	.29	@31
Blue, Ultramarine	.3½	@15
Brown, Spanish	.½	@ 1
Carmine, No. 40	$3.10	@3.25
Green, Chrome, ordinary	.3½	@ 5
Green, Chrome, pure	.17	@25
Lead, Red, bbls., ½ bbls., kegs.		@ 6¾
Litharge, bbls., ½ bbls., kegs.		@ 6¾
Ocher, American	℔ ton	$3.50@16.00
American Golden	.2½	@ 3¼
French	.1¼	@ 2
Foreign Golden	.3	@ 4
Orange Mineral, English	.10	@12
French	.12¾	@13
German	.12	@13
American	.8½	@ 8¾
Red, Indian, English	.4½	@ 6
American	.3	@ 3¼
Red, Turkey, English	.4	@10
Red, Tuscan, English	.7	@10
Red, Venetian, Amer.	℔ 100 lb	$0.50@1.25
English	℔ 100 lb	$1.15@1.60
Sienna, Italian, Burnt and Powdered	.3	@ 9
Italian, Raw, Powdered	.3	@ 7
American, Raw	.1½	@ 2
American Burnt and Pow'd.	.1½	@ 2
Talc, French	℔ ton	$18.00@25.00
American	℔ ton	15.00@25.00
Terra Alba, French	℔ 100 lb	.90@ 1.00
English	℔ 100 lb	.80@ 1.00
American	℔ 100 lb, No. 1,	.75@ .80
American	℔ 100 lb, No. 2,	.60@ .65
Umber, Turkey, Bnt. & Pow.	.2¾	@ 3
Turkey, Raw and Powdered	.2¾	@ 3
Burnt, American	.1½	@ 2
Raw, American	.1½	@ 2
Yellow, Chrome, Pure	.13¾	@15
Vermilion, American Lead	.7	@25
Quicksilver, bulk	.65	@..
Quicksilver, bags		@66
English, Imported	.65	@70
Chinese		$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent....35%
Taplin's Perfection....35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anti—Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ℔ doz. pairs, Nos. 1, $0.75; 2, $0.80; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ℔ doz. pairs ....$2.00@$3.00

Anvils—American—

Eagle Anvils....℔ lb @8½¢
Hay-Budden, Wrought....9½@9¾¢
Trenton ....℔ lb 9½@9¾¢

Imported—

Swedish Solid Steel Sisco, Superior, ℔ lb....10@10½¢
Peter Wright & Sons, ℔ lb, 84 to 349 lb, 11¢; 350 to 600 lb, 11½¢.

Anvil, Vice and Drill—

Millers Falls Co., $18.00....15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Livingston Nail Co....10%

Augers and Bits—

Com. Double Spur....75&10@80%
Jennings' Patn., Bright.65&10@70%
Black Lip or Blued...65@65&5%
Boring Mach. Augers....70%
Car Bits, 12-in. twist....40&10%
Ford's Auger and Car Bits....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list, 25&7½%
No. 30, R. Jennings' list....50%
Russell Jennings'....25&10&2½%
L'Hommedieu Car Bits....15%
Mayhew's Countersink Bits....45%
Pugh's Black....20%
Pugh's Jennings' Pattern....35%
Snell's Auger Bits....60%
Snell's Bell Hangers' Bits....60%
Snell's Car Bits, 12-in. twist....60%
Snell's King Auger Bits....50%
Wright's Jennings' Bits....50%

Bit Stock Drills—See *Drills, Twist.*

Expansive Bits—

Clark's Pattern, No. 1, ℔ doz., $26; No. 2, $18....60&10%
Ford's, Clark's Pattern....66⅔&5%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00....60&10%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dbl. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—

Bonney Pat., per doz..$5.50@6.00
Ames ....2o&10%
Universal 20%

Ship Augers and Bits—

Ship Augers....40&10@—%
Ford's ....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 6%
Watrous' ....33⅓&7½%
Snell's 48%

Awl Hafts—See *Handles, Mechanics' Tool.*

Awls—

Brad Awls:
Handled ....gro. $2.75@3.00
Unhdled, Shldered...gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@3¼¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket.gro.$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights: Per doz.
First Quality....$4.75@5.00
Second Quality....$4.25@4.50
Double Bit, base weights:
First Quality....$7.00@7.50
Second Quality....$6.50@6.75

Axle Grease—

See *Grease, Axle.*

Axles—

Iron or Steel.
Concord, Loose Collar..4½@5 ¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose...3¾@4¼¢
No. 1½ Com., New Style..4½@5 ¢
No. 2 Solid Collar....4½@5 ¢
Half Patent:
Nos. 7, 8, 11 and 12..65@65&10%
Nos. 13 to 14....65@65&10%
Nos. 15 to 18....70@70&10%
Nos. 19 to 22....70@70&10%

Boxes, Axles—

Common and Concord, not turned ....lb., 5@6¢
Common and Concord, turned, lb., 6@7¢
Half Patent....lb., 9½@10¢

Bait—

Fishing—

Hendryx:
A Bait....20%
B Bait....25%
Competitor Bait....20&5%

Balances—

Sash—

Caldwell new list....50&10%
Pullman ....50&10%

Spring—

Spring Balances....50&10@60%
Chatillon's:
Light Spg. Balances....50@50&10%
Straight Balances....40@40&10%
Circular Balances....50&10%
Large Dial....30%

Barb Wire—See *Wire, Barb.*

Bars—

Crow—

Steel Crowbars, 10 to 40 lb.... per lb., 2¼@2½¢

Towel—

No. 10 Ideal, Nickel Plate..℔ gro. $8.50

Beam, Scale—

Scale Beams....40%
Chattillon's No. 1....30%
Chatillon's No. 2....40%

Beaters,

Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ℔ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned....℔ doz. $1.50

Beaters Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. 4, Jap'd, $1.15; No. 8, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover....$6.50

Bellows—

Blacksmith, Standard List:
Split Leather....60&10@65%
Grain Leather....50@50&10%

Hand—

Inch..	*6*	*7*	*8*	*9*	*10*
Doz..	*$5.00*	*5.50*	*6.00*	*6.50*	*7.50*

Molders—

Inch..	*10*	*12*	*14*	*16*
Doz..	*$7.50*	*9.00*	*12.00*	*15.00*

Net Prices.

Bells—

Cow—

Ordinary Goods...75&5@75&10&5%
High grade....70&10@75%
Jersey ....75&10%
Texas Star....50%

Door—

Home, R. & E. Mfg. Co.'s....55&10%

Hand—

Polished, Brass....50&10@60%
White Metal....50&10@50&10&5%
Nickel Plated....50&5%
Swiss ....50&5%
Cone's Globe Hand Bells....33⅓@35%

Miscellaneous—

Farm Bells....lb., 2¼@2½¢
Church and School....60@60&5%

Belting—

Leather—

Standard ....70&10@70&10&5%
Light ....75&10%
Cut Leather Lacing....50&10%
Leather Lacing Sides, per sq. ft. 22@23¢

Rubber—

Competition (Low Grade), 70&10@75&5%
Standard ....60@60&10%
Best Grades....33⅓ @40&10%

Bench Stops—

See *Stops, Bench*

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters 20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1907 list: Chain, Parts, Spokes....50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks

Tackle—

Common Wooden....75@75&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined....55%
Embossed 55%

Boards, Wash—

See *Washboards.*

Bobs, Plumb—

Keuffel & Esser Co....33⅓%

Bolts

Carriage, Machine, &c.—

Common Carriage (cut thread):
⅜ x 6 and smaller..75&5@—%
Larger and longer....70@—%
Phila. Eagle, $3.00 list...80@—%
Bolt Ends....70@—%
Machine (Cut Thread):
⅜ x 4 and smaller..75&10@—%
Larger and longer....70@—%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knobs:

Inch ...	*3*	*4*	*5*	*6*	*8*
Per doz..	*$0.30*	*.35*	*.45*	*.60*	*.80*

Cast Iron Spring Foot, Jap'd:

Inch	*6*	*8*	*10*
Per doz....	*$1.20*	*1.50*	*2.25*

Cast Iron Chain, Flat, Japanned:

Inch	*6*	*8*	*10*
Per doz....	*$1.00*	*1.40*	*1.65*

Cast Iron Flat Shutter, Jap'd, Brass Knobs:

Inch	*6*	*8*	*10*
Per doz....	*$0.75*	*.95*	*1.25*

Wrought Barrel Jap'd..80@80&10%
Barrel Bronzed....60&10%
Spring ....70&10@70&10&10%
Shutter ....50&5@50&10&5%
Square Neck....75@75&10%
Square ....70&10&10%
Ives' Patent Door....55%
Ives' Wrought Metal....45%

Expansion—

F. H. Evans' Crescent....40@60%
Richards Mfg. Co....55&10%
Steward & Romain Mfg. Co.:
Style No. 13, Double....60%
Style No. 1, Single....60%
Style No. 100, Dbl. Jaw, Single..55%
Lag Screw....66⅔%

Plow and Stove—

Plow ....65&5@70%
Stove ....85@85&5%

Tire—

Common Iron....80%
Norway Iron....80%
American Screw Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Bay State, list Dec. 28, '99....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Eclipse, list Dec. 28, '99....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99....80%
Norway Phila., list Oct. '84....80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99....80%
Phila., Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts....72½%

Borers, Bung—

Borers Bung, Ring, with Handle:

Inch....	*1¼*	*1½*	*1¾*	*2*
Per doz...	*$4.80*	*5.60*	*6.40*	*8.00*
Inch....	*2¼*	*2½*		
Per doz....	*$8.65*	*11.50*		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each....25%

Boxes, Mitre—

C. E. Jennings & Co....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme ....15&10%
Perfection 40%
Seavey 45%

Braces—

Comman Ball, American....$1.50
Barber's ....50&10&10@60&10%
Fray's Genuine Spofford's....60%
Fray's No. 61, 166, 206, 614....50%
C. E. Jennings & Co....50&5%
Mayhew's Ratchet....60%
Mayhew's Quick Action Hay Pat..50%
Millers Falls Drill Braces....25&10%
P., S. & W. Co., Peck's Pat....60&10%

Brackets—

Wrought Steel....70&10@75&10%
Bradley Metal Clasp...80&10@80&10&5%
Griffin's Pressed Steel....75@75&10%
Griffin's Folding Brackets....70&10%
Taplin Victor Handy Egg Beater Bracket ....℔ doz. $1.50

Bright Wire Goods—

See *Wire and Wire Goods.*

Broilers—

Kilbourne Mfg. Co....75&20%
Wire Goods Co....75%

Buckets, Galvanized—

M'fr's list, price per gross.				
Quart..	*10*	*12*	*14*	
Water, Reg...	*26.85*	*29.50*	*33.50*	
Water, Hvy...	*45.35*	*48.00*	*52.00*	
Fire, Rd. Btm..	*32.00*	*34.65*	*38.65*	
Well	*37.35*	*41.35*	*45.35*	

10&7½&65&5%

Bull Rings—See *Rings, Bull.*

Butts—

Brass—

Wrought, High List, Oct. 26,'06.55%
Cast Brass, Tiebout's....40%

Cast Iron—

Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint....70&10@75%
Loose Pin....70&10@75%
Mayer's Hinges....70@70&5
Parliament Butts....70@70&5

Wrought Steel—

Bright.
Light Narrow, Light Reversible ....70&5%
Reversible and Broad..70&5%
Loose Joint, Narrow, Light Inside Blind, &c....70%
Back Flaps, Table Chest..65%
Japanned.
Light Narrow, Loose Pin, 40&5%
Light Narrow, Ball Tip..60%
Broad ....40&5%
Steeple Tipped....70%
Ball Tipped....70%

Extra, 10@—

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 900 ..... 30%
Hendryx Bronze: Series 700, 800....30%
Hendryx Enameled..... 30%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 4¼@4¾¢
Sharp, 1 prong, per lb., 4¾@5¼¢
Burke's, Blunt, 4@4¾¢; Sharp, 4½@5¼¢
Lautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

Can Openers—

See *Openers, Can.*

Caps, Percussion—

Eley's E. B.....52@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket .....per M 62@63¢

Primers—

Berdan Primers, $2 per M..20&5%
Primer Shells and Bullets..15&10%
All other primers per M..$1.52@1.60

Carpet Stretchers—

See *Stretchers, Carpet.*

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd..$190
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets..15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed .....65&10%
Plate .....60&5%
Philadelphia .....70&10%
Acme, Ball Bearing.....35%
Gem (Roller Bearing).....70&10&10&5%
Steel Gem.....50%
Standard Ball Bearing.....45%
Yale (Double Wheel) low list...40&10%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Proof Coil—

American Coil, Straight Link:
3-16 ¼ 5-16 ⅜ 7-16 ½ ⅝
$8.15 5.55 4.80 3.95 3.75 3.65 3.55
¾-⅞-1 1⅛ to 1¼ inch.
$3.45 3.55
In cask lots, deduct 25¢.
German Coil.....60@60&5%
German Pattern Coil:
6-0 to 1.....70&5@70&10%
2 and 3..60&10&10@60&10&10&5%
4, 5 and 6.....50&10@50&10&5%

Halter—

Halter Chains.....60@60&5%
German Pattern Halter Chains, list July 24, '97.....60&10&5%
Covert Mfg. Co.:
Halter .....35&5%

Cow Ties—

See *Halters and Ties.*

Trace, Wagon, &c.

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring..$28.00
6½—6-2, Straight, with ring..$29.00
6½—8-2, Straight, with ring..$32.00
6½—10-2, Str'ght, with ring..$37.00
NOTE.—Add 2c per pair for Hooks Twist Traces: add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.
Eastern Standard Traces, Wagon Chain, &c...60&10@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron .....60&10&7½%
Brass 65%
Safety and Plumbers' Chain..75%
Gal. Pump Chain....lb., 4½@5%
Bridgeport Chain Co.:
Triumph Halter and Coil.35&2½@40%
Triumph Dog.....50&10@60%
Brown Halter and Coil....45@50&5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion 40%
Oneida Community:
American Halter, Dog and Kennel Chains .....35&2½@40%
Niagara Dog Leads and Kennel Chains .....45@50&5%
Wire Goods Co.:
Dog Chain.....70%
Universal Db'l. Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain.....60%
Pullman:
Bronze Chain, 60%; Steel Chain, Coppered .....60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft. .....$2.00@$5.00
Sash Ribbon Attachments, per set..8¢

Chalk— (From Jobbers.)

Carpenters' Blue.....gro., 50@55¢
Carpenters' Red.....gro., 45@50¢
Carpenters' White...gro., 40@45¢

Checks, Door—

Bardsley's 45%
Pullman, per gro.....$54.00
Russwin 33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....50%
Youths' Chests, with Tools.....35%
Gentlemen's Chests, with Tools..25%
Farmers', Carpenters, etc., Chests, with Tools 20%
Machinists' and Pipe Fitters' Chests, Empty.....45%
Tool Cabinets.....45%
C. E. Jennings & Co.'s Machinists' Tool Chests.....7½%

Chisels—

Socket Framing and Firmer

Standard List.....80&10@—%
Buck Bros.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25&7½%
Socket Framing No, 15.....25&7½%
Swan's .....66⅔@70%
L. & I. J. White & Co.....30@30&5%

Tanged—

Tanged Firmers.....30&5@35%
Buck Bros.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co.....25&5%

Cold—

lb.
Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary.... 9@10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat, each $8.00.....35&5%
Empire 25%
Blacksmiths' 25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....35%
Universal, Reversible Jaws.....35%
Combination, Reversible Jaws....35%
Drill Chucks, New Model, 25%; Standard, 45%; Skinner Pat. 25%; Positive Drive.....40%
Planer Chucks.....20%
Face Plate Jaws.....35%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 11, 40%; No. 21.....35%
Scroll Combinations, Nos. 83 and 84 .....30%
Geared Scroll, Nos. 33, 34 and 35..25%
Independent Iron, Nos. 18 and 318.35%
Independent Steel, No. 64.....25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35%
Union Czar Drill.....25%
Universal, 11, 12, 16, 17, 13, 14, 15..40%
Universal No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and 72 .....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill...50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%
Whitaker Mfg. Co.:
National Drill.....25%

Clamps—

Adjustable Hammers.....20@20&5%
Carriage Makers', P., S. & W. Co. .....50&10%
Besly, Parallel.....33⅓&10%
Myers' Hay Rack.....45%
Lineman's Swedish Neverturn.....65%
Wood Workers' Hammers.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain,

Iwan's Champion, Adjustable.....50%
Iwan's Champion, Stationary.....40%

Sidewalk—

Star Socket, All Steel..℔ doz. $4.05 net
Star Shank. All Steel..℔ doz. $3.24 net
W. & C. Shank, All Steel, ℔ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Co.:
1902 Chicago Horse, each..$10.75
20th Century Horse, each...$5.00
Lightning Belt Horse, each..$15.00
Chicago Belt Horse, each..$20.00
Stewart's Enclosed Gear Horse ..each.....$6.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} 20%

Clips, Axle—

Regular Styles, list July 1, '05, 80&80&10%

Cloth and Netting, wire

—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c 75%
Compression Bibbs.....70%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list 40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%

Conductor Pipe,—

L. C. L. to Dealers:

	Gal. Steel.	Charcoal.
Northeastern	*70&10%*	*50&10&7½%*
Eastern	*75%*	*50&10&7½%*
Pittsburgh	*75&10&5%*	*60%*
Central	*75&10%*	*60%*
Northwestern	*75&7½%*	*60%*
Western	*70&12½%*	*50&12½%*
Tennessee	*70&10%*	*50&12½%*
Southern	*70%*	*50&12½%*
Southwestern	*70%*	*50&5%*

Terms, 60 days: 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:

Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles,					
Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled.....10%
Agate Lined.....10%

Coppers' Tools—

See *Tools, Coopers'.*

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair and heavier, 22@25¢; lighter than 3 lb. to pair.....24@27¢

Cord— Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 20¢; No. 7, 20½¢; No. 6, 21½¢. In lots of 12 doz. or over, 1 cent less per pound.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....lb., 11@11½¢
Cotton Sash Cord, Tw'ted..18@20¢
Patent Russia.....lb....20¢
Cable Laid Russia.....lb...21¢
India Hemp, Br'd'd.....lb...21¢
India Hemp, Twisted...lb.13@14¢
Patent India, Twisted..lb...17¢
Pearl Braided, cotton, No. 6, ℔ lb, 27½¢; No. 7, 26½¢; Nos. 8 to 12, 26¢
Eddystone Braided, Nos. 8 to 12, 26¢; 7, 26½; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to10.....℔ lb 23¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per 100..$2.00
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White...℔ lb 40¢
Massachusetts, Drab....℔ lb 45¢
} 15%
Phoenix, White, Nos 8 to 12....27¢
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

Full Length.....90@—%
Short Length.....90&20@—%
Hendryx Standard Wire Picture Cord, old list, 85&10%
Turner & Stanton Co. Wire Picture Cord .....85&10%

Cradles—

Grain .....40&12½%

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@$7.50 at factory, but lower prices made by jobbers.
Zelnicker's Lumber: ℔ gro. White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks.....$10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ⅛ in. Square, $1.75; 5 x ⅛ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00
Suremark, Black, $2.25; Blue, Red and Yellow.....$2.50

Crooks, Shepperds'—

Fort Madison, per doz., Heavy, $5.50; Light $5.00

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....℔ doz. $3.00
Wm. Rogers & Son.....℔ doz, $2.50

Cutters— Glass—

H. H. Mayhew Co.....40%
Red Devil.....60%
B. Mfg. Co.....40%
Woodward 50%

Meat and Food—

American 30%

Nos.	401	402	403	404	405	406	407
Each	$5	$7	$10	$12	$25	$50	$60

Enterprise:

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

25@25&7½%
No. 202, $1.50.....40&7½%
P., S. & W. Co.:
Dixon's .....℔ doz. 33⅓%

Nos...	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal .....40@40&5%
Hales .....60&10&5%
Little Giant.....℔ doz. 40@50%

Nos..	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

New Triumph No. 605, ℔ doz. $24.00. 40&10%
Russwin Food, No. 1, $24.00; No. 2, $27.00 .....45&10&10%
$15.00 $18.00
Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater .....℔ doz. $4.00

Tobacco—

All Iron, Cheap...doz, $1.25@4.50
Enterprise .....25@30%
National, ℔ doz., No. 1, $21; No. 2, $18 .....40%

Diggers, Post Hole, &c—

Disston's:
Rapid, ℔ doz., $24.00.....25%
Samson, ℔ doz., $34.00.....25%
Iwan's Imp'ved Post Hole Auger..40%
Vaughan Pattern Post Hole Augers, ℔ doz., $7.00
Perfection Post Hole Diggers, ℔ doz. $8.75
Split Handle Post Hole Diggers, ℔ doz., $7.75
Hercules Pattern, ℔ doz.....$10.00
Kohler's, ℔ doz., Universal, $15.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer.....$7.50
Never-Break Post Hole Diggers, ℔ doz., $24.00.....60%

Dividers—See *Compasses.*

Drawing Knives—

See *Knives, Drawing.*

Dressers Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmith's Common Drilling Machines .....$1.50@1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....33⅓%
Goodell Automatic Drills.50&10@60&10%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved 40%
Ratchet, No. 012.....40%
Ratchet, Celebrated.....40%
Ratchet, Whitney's, P., S. & W. .....50&5%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....70@70&5%
Taper and Straight Shank, 60&10@70%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ℔ doz., 2¼-in., $6; 4-in., $7.50; 6-in., $9 .....50%
Buck Bros.' Screw Driver Bits.....30%
Champion 50%
Disston's 70%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65@65&10%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, Nos. 20 and 21...25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
Smith & Hemenway Co., Neverturn, 66⅔%; Elmora, ℔ gr. 30&10%
Swan's:
Nos. 7565 to 7568, 66⅔%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory...	Gal. Steel.	Charcoal. Iron.
Northeastern	*75&10&5%*	*60&20%*
Eastern	*80&12½%*	*60&20%*
Pittsburgh	*80&20%*	*65&10%*
Central	*80&10&10&2½%*	*65&10%*
Northwestern	*80&10&10%*	*65&10%*
Western	*80&10%*	*60&10&5%*
Tennessee	*80&5%*	*60&10&5%*
Southern	*80%*	*60&10&5%*
Southwestern	*75&10&2½%*	*60&5%*

Terms.—2% for cash. Factory shipments generally delivered.
Note.—Lower prices are made in some sections.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. I. Standard Gauge....85@85&10%
No. 26.....50%
No. 24.....25%
No. 22.....10%

Elbows, Stove Pipe—

Edwards, Standard Blue....40&10&10%
Edwards, Royal Blue.....40&10&10%
Reeves, Dover, one piece.....40&10%

Emery, Turkish—

	¼ to ½6:	½ to 220:	Flour.
Kegs .....lb.	*5¢*	*5½¢*	*3½¢*
½ Kegs.....lb.	*5¼¢*	*5¾¢*	*3¾¢*
¼ Kegs.....lb.	*5½¢*	*6¢*	*4¢*
10-lb. cans, 10 in case....	*6½¢*	*7¢*	*6¢*
10-lb. cans, less than 10....	*10¢*	*10¢*	*8¢*
Less quantity..	*10¢*	*10¢*	*8¢*

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice—

—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's ..... 50&10%
Walling's ..... 40&10%
Upson's Patent 40%

Cord and Weight—
Ives and Titan 33⅓%

Corrugated—
Acme Corrugated Fasteners 70%

Faucets—
Cork Lined ..... 50&10@60%
Metallic Key, Leather Lined, 60&10@70%
Red Cedar ..... 40&5@40&10&5%
Petroleum ..... 70&10@75%
B. & L. B. Co.:
Metal Key ..... 60&10%
Star 60%
West Lock ..... 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Mtl. Key. 50&10%
John Sommer's Duplex Metal Key .. 60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined .. 50%
John Sommer's Reliable Cork Lined .. 50&10%
John Sommer's Chicago Cork Lined. 60%
John Sommer's O. K. Cork Lined 60%
John Sommer's No Brand, Cedar 60%
John Sommer's Perfection, Cedar 40%
Self Measuring:
Enterprise, ₱ doz. $36.00 ..... 40&10%
Lane's, ₱ doz. $36.00 ..... 40&10%
National Measuring, ₱ doz. $36. 40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands ..... 70&10@75&10%
Standard Brands ..... 75&10@80%
Lower Grade ... 75&10&10@80&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97 ..... 35 1-3@40%

Fixtures, Fire Door—
Allith Underwriters' Approved 50%
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 ..... $3.75
Fusible Links, No. 96 ..... 50%
Expansion Bolts, No. 107 ..... 60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.60*	*3.85*	*4.15*	*4.65*

P., S. & W. Co. 25%
Reading Hardware Co. 60%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato ..... 60&10%
Victor, Hay ..... 60&15&2½%
Victor, Manure 60%
Victor, Header 60%
Champion, Hay 60%
Champion, Header 60%
Champion, Manure ..... 60&15&2½%
Columbia, Hay ..... 60&20%
Columbia, Manure 70%
Columbia, Spading ..... 70&12½%
Hawkeye Wood Barley 40%
W. & C. Potato Digger ..... 60&10%
Acme Hay ..... 60&20%
Acme Manure, 4 tine ..... 60&10&5%
Dakota Header ..... 60&20%
Jackson Steel Barley ..... 60&20%
Kansas Header 65%
W. & C. Favorite Wood Barley 40%
Plated.—See Spoons.

Frames— Wood Saw—
White, S'g't Bar, per doz. 75@80¢
Red, S'g't Bar, per doz. $1.00@1.25
Red, Dbl. Brace, per doz. $1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.35*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped .. 3.65
Waterproof Dbl. Taped .. 4.40
Waterproof Tpl. Taped .. 5.15
Extra 10&7½%.

Gates, Molasses and Oil—
Stebbins' Pattern ..... 80@80&5%

Gauges—
Marking, Mortise, &c. 50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c. ..... 50&50&10%
Disston's Marking, Mortise, &c. .. 67½%
Wire, Brown & Sharpe's 33⅓%
Wire, Morse's 25%
Wire, P., S. & W. Co. 33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co. ..... 65@65&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush .. 25&10@50%
Elwell's 60%

Grease, Axle—
Common Grade .... *gro. $6.00@6.50*
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ₱ doz., 1 lb, $1.20; 2 lb. $2.00
Helmet Hard Oil 25%

Griddles, Soapstone—
Pike Mfg. Co. ..... 33⅓@33⅓&10%

Grinders—
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 ..... 30%
Alundum Sickle Grinders, each, Nos. 20, $5.00; 20A, $6.00; 20A Combined, $6.50 ..... 30%
Alundum Disc Grinders, each, $2.50 ..... 30%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ₱ inch, ₱ doz., $2.00 ..... 33⅓%
Richards Mfg. Co., Eli and Cycle Ball Bearing, mounted 40%

Grips, Nipple—
Perfect Nipple Grips ..... 40&10&2%

Halters and Ties—
Cow Ties ..... 65@65&10%
Bridgeport Chain Co.:
Triumph Coil and Halters. 35&2½@40%
Brown Coil and Halters... 45@50&5%
Brown Cow Ties ..... 50&5@50&10&5%
Brown Tie Outs ..... 70&10@75&5%
Covert Mfg. Co.:
Web ..... 30&2%
Jute Rope 35%
Sisal Rope 20%
Cotton Rope 45%
Hemp Rope 40%
Oneida Community:
Am. Coil and Halters ..... 40@40&5%
Am. Cow Ties ..... 45@50%
Niagara Coil and Halters.. 45@50&5%
Niagara Cow Ties .... 45&5@50&10&5%

Hammers—
Handled Hammers—
Heller's Machinists' ... 55&10@55&10&5%
Heller's Farriers' ..... 40&5@40&10&5%
Peck, Stow & Wilcox Co.:
Crucible Steel ..... 40&10%
Farriers' ..... 40&10%
Riveting ..... 40&10%
Machinists' ..... 60&10%
Blacksmiths' 50%
Fayette R. Plumb:
A. E. Nail ..... 40&2½@40&12½%
Eng. and B. S. Hand. 50&10&5@60&5%
Machinists' Hammers ..... 60@60&10%
Rivet and Tinners' 40&7½@40&12½&5%

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢ ... 80&10%
3 to 5 lb., per lb., 60¢ ..... 80&10%
Over 5 lb., per lb., 30¢ .....
Over 5 lb., per lb., 30¢. 80&10&10%

Handles—
Agricultural Tool Handles
Axe, Pick, &c. ... 60&10@60&10&5%
Hoe, Rake, &c. 40%
Fork, Shovel, Spade, &c.:
Long Handles 40%
D Handles 40%

Cross-Cut Saw Handles—
Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted ... gro. $3.00@$3.50
Brad Awl ..... gro. $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@$2.65; Hickory ..... $2.15@2.40
Socket Firming, Apple, $1.75@$1.95; Hickory .... $1.60@$1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted ..... gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished ... 65@75¢
Plane Handles:
Jack, doz. .30¢; Fore, doz. .45¢.
Chapin-Stephens Co.:
Carving Tool ..... 30@30&10%
Chisel ..... 60@60&10%
File and Awl ..... 60@60&10%
Saw and Plane ..... 30@30&10%
Screw Driver ..... 30@30&10%
Millers Falls Adj. and Ratchet Auger Handles ..... 15&10%
Nicholson Simplicity File Handle .... ₱ gro. $0.85@$1.50
J. L. Osgood:
Indestructible File and Tool, ₱ gro., No. 1, $8.00; No. 2, $8.50; No. 3, $9.00; No. 4, $9.50; No. 5, $10.00 ..... gro. lots 10%
W. A. Zelnicker Supply Co.:
Hammer, ₱ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 in., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ₱ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe, ₱ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ₱ doz., 36 in., $5.80; 38 in., $7.80.
Pick, ₱ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ₱ doz., 12 to 14 in., $2.00.
Extra 10% often given.

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, &c.

Allith Mfg. Co.:
Reliable, Nos. 1 and 2; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door 50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle ..... 60&2½%
Roller Bearing ..... 70&2½%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00 .. 60&10%
Roller Bearing, No. 11, $15.00. 60&10%
Roller Bearing, Ex. Hy., No. 22, $18.00 ..... 60&10%
Bull Dog, $24.00 ..... 70%
Lane Bros. Co.:
Parlor, Ball Bearing, $1.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard ..... 60&10%
Hinged ..... net $6.08
Covered ..... 60&5%
Special ..... 70&5%
Lawrence Bros.:
Advance ..... 55&10%
Cleveland ..... 70&7½%
Clipper, No. 75 ..... 60%
Crown ..... 55&10%
Cyclone, No. 40 ..... net $6.50
Tandem, No. 50 ..... net $7.50
New York ..... 55&10%
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2. 70%
Anti-Friction 60%
Hinged Hangers, King Charm. 60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3. $2.25
Roller B'r'g St'l Track No. 12. $2.20
Roller B'r'g St'l Track No. 13. $2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19. 50&10%
Adjustable Track Tandem Trolley Track No. 16 ..... 50&10%
Seal, Steel Track No. 8 ..... $2.25
Auto Adj. Track No. 22.—50&5%
Trolley B. D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150 ..... $2.50
Safety Underwriters F. D. No. 101 ..... 50%
Tandem No. 41, 2½ and 3 .. 60&10%
Place, Adjustable Track No. 132 ..... 50&5%
Royal, Adjustable Track No. 122 ..... 50&10%
Ives' Wood Track No. 1 ..... $2.25
Trolley B. D. No. 20 ..... 50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28 ..... $1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2. 70&7½%
Anti-friction, Nos. 42; No. 44 sizes 2½ and 3 ..... 60%
Hinged Tandem No. 48 .... 65&5%
Folding Door B. B. Swivel No. 135 ..... 40%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing. 50&15&10&5%
Myers' Stayon Hangers 60%

Hangers— Garment—
Pullman Trouser, ₱ gro., No. 1, $9.00; No. 4, $24.00; No. 5, $16.50; No. 8, Black Enamel, $7.50; No. 10, $21.00; No. 12, $8.00; No. 15, Rods, $9.00; No. 18, Loops $10.00
Victor Folding ..... ₱ gro. $9.60

Gate—
Myers' Patent Gate Hangers, ₱ doz. net $4.50

Joist and Timber—
Lane Bros. Co. 30%

Hasps—
Griffin's Security Hasp ..... 50&10%
McKinney's Perfect Hasp, ₱ doz. .60%

Hatchets—
Regular list, first qual. 40&2½@—
Second quality ..... 50&5@—

Heaters, Carriage—
Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50 ..... 25%
Clark Coal, ₱ doz., $0.75 ..... 20%

Hinges—
Blind and Shutter Hinges
Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Acme, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Charles Parker Co. ..... 70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00 ..... 20%
Reading's Gravity 60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ₱ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter ..... 75&5%
Acme, Lull & Porter 75%
Queen City Reversible 75%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 75&5%
Tip Pat'n, No. 1 ..... 75&10%
No. 3 ..... 75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5 ..... 70&10&5%
Shepard's Double Locking 75%
Champion Gravity Locking ..... 75&5%
Pioneer ..... 75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 60&10%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs.	*$2.00*	*2.70*	*5.00*
Hinges only	*1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.35*

New England:
With Latch ..... doz. ... @$2.00
Without Latch ... doz. ... @$1.60
Reversible Self-Closing:
With Latch ..... doz. ... @$1.75
Without Latch ... doz. ... @$1.35
Western:
With Latch ..... doz. $1.75
Without Latch ..... doz. $1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3 ..... 70%

Pivot Hinges—
Bommer Bros. Pivot 40%
Lawson Mfg. Co. Matchless 50%

Spring Hinges—
Holdback, Cast Iron ... $6.75@$7.00
Non-Holdback, Cast Iron $6.50@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges 40%
Bardsley's Patent Checking. 33⅓%
Bommer Bros.:
Bommer Ball Bearing Floor. 40%
Bommer Spring Hinges 40%
No. 999 Wrot, Steel Hold Back, ₱ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges 25%
Triple End Spring Hinges 50%
Chicago (Ball Bearing) Floor. 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Columbian Hardware Co.:
Acme, Wrought Steel 30%
Acme, Brass 25%
American 30%
Columbia, ₱ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ₱ gr. $12.00
Columbian Hinges ..... 60&10%
Gem, new list 30%
Clover Leaf and Acorn, gro. lots, $5.10; ½ gro. lots $6.00
Oxford, new list 30%
Floor Spring Hinges ..... 65&10%
Lawson Mfg. Co. Matchless 30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door ..... ₱ gr. $9.00
Chief Ball Bearing Floor Hinge 50%
Ball Bearing Door 25%
No. 777, Sheet Steel Holdb'k, ₱ gr., pr. $9.00
Standard Mfg. Co.:
Champion Double Acting Door Hinge ..... 25&10&10%
Standard Double Acting Floor Hinge ..... 25&10&10%
Superior Spring Hinge Co.:
Superior Floor Hinges 33⅓%
Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges .. 50&10%
Heavy Strap Hinges .. 60&5%
Light T Hinges 50%
Heavy T Hinges 40%
Extra Hvy. T Hinges. 50&10%
Hinge Hasps 33⅓%
Cor. Heavy Strap ... 60&5%
Cor. Ex. Heavy T ... 50&10%
Extra 10&7½%.

Screw Hook and strap.
6 to 12 in.. lb. 3½¢
1¼ to 20 in.. lb. 3¼¢
22 to 36 in.. lb. 3 ¢

Screw Hook and Eye:
¾ to 1 inch ..... lb. 6½¢
⅝-inch ..... lb. 7½¢
½-inch ..... lb. 8½¢
Extra 10&7½%.

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers .. 30&2%

Hods— Coal—
M'f'gr's list, price per gross

Inch	*15*	*16*	*17*	*18*
Galv. Open	*$35*	*$39*	*$42*	*$46*
Jap. Open	*26*	*28*	*31*	*35*
Galv. Funnel	*43*	*48*	*52*	*56*
Jap. Funnel	*33*	*36*	*39*	*43*

Extra 10&7½%.

Masons' Etc.
Cleveland Wire Spring Co.:
Steel Brick, No. 162 ..... each $1.05
Steel Mortar, No. 158 ..... each $1.35

Hoes— Eye—
Scovil and Oval Pattern ..... 60&10@60&10&10%
Grub, list Feb. 28, 1899 ..... 70&10@70&10&10%
D. & W. Scovil 27½%
Am. Fork & Hoe Co. (Scovil Pattern) 60%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit.....$3.20
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ₩ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₩ doz. 40&5%
Junior Size.....₩ doz. $4.00
Ft. Madison Sprouting Hoe, ₩ doz., 60&10%
Ft. Madison Dixie Tobacco Hoe..... 75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.40
B. B., 6½ in.....$3.50
Acme Wedding.....₩ doz., net, $4.36
W. & C. L'tning Shuffle Hoe, ₩doz.$5.25

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ₩ doz. $24.00.....45&10%

Door—

Bardsley's, Iron, 40%; Brass and Bronze 25%
Empire 50%
Pullman 25%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip 50%
Superior 33⅓%

File and Tool—

Nicholson File Holders and File Handles .....33⅓&40%

Fruit Jar—

Triumph Fruit Jar Holder, ₩ gross, $10.80; ₩ doz.....$1.25

Trace and Rein—

Fernald Double Trace Holder, ₩ doz. pairs $1.25
Dash Rein Holder, ₩ doz. pairs..$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty, 50%; German.....33⅓%

Hooks—Cast Iron—

Bird Cage, Reading.....60%
Clothes Line, Reading List.....40%
Coat and Hat, Reading.....45&20%
Coat and Hat, Wrightsville.....60&5%
Harness, Reading List.....40%

Wire—

Belt 80%
Wire C. & H. Hooks.....80%
Bradley Metal Clasp Wire, Coat and Hat, 70&10%; Ceiling.....70&10%
Columbian Hdw. Co., Gem.....70&5%
Parker Wire Goods Co., King..70&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton .....*doz. $1.05@$1.85*
Wrought Staples, Hooks, &c.—See Wrought Goods.

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz.$3.00
Grass, common grades, all sizes, per doz.....$1.50
Whiffletrees.....*lb. 5¾@6¢*
Hooks and Eyes:
Brass.....60@60&10%
Malleable Iron.....70@70&10%
Coven Mfg. Co. Gate and Scuttle Hooks 40%
Ft. Madison Cut-Easy Corn Hooks, ₩ doz. $3.25 net
Turner & Stanton Co. Cup and Shoulder .....80&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....*ft. 5@ 6¢*
3-ply Guaranteed.....*ft. 8@ 9¢*
4-ply Guaranteed.....*ft. 10@11¢*
Cotton Garden, ¾-in., coupled:
Low Grade.....*ft. 8@ 9¢*
Fair Quality.....*ft. 10@11¢*

Irons— Sad—

From ¼ to 10.....*lb. 3@3½¢*
B. B. Sad Irons.....*lb. 3¼@3½¢*
Mrs. Potts', cents per set:

	Nos. 50	55	60	65
Jap'd Tops	83	80	93	91
Tin'd Tops	88	85	98	95

New England Pressing..lb.5¾@4¢

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%; Corner 60%

Pinking—

Pinking Irons.....*doz.80¢*

Irons, Soldering

See *Coppers.*

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport 50%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130...80&10%
Smith & Hemenway Co.'s.....25%

Ladder—

Richards Mfg. Co., Ladder Jacks..50%

Kettles—

Brass, Spun, Plain.....*80@25%*
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—

Columbian Cutlery Co., Wilcut Brand Knives and Hooks.....60%
Withington Acme, ₩ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....*80&10@—%*
C. E. Jennings & Co., Nos. 45, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 66⅔&7½%
Swan's .....66⅔@70%
Watrous 16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge, per doz.$5.50@5.75
Iwan's Sickle Edge.....₩ doz. $9.50
Iwan's Serrated.....₩ doz. $10.00

Miscellaneous—

Farriers' .....*doz.$2.60@3.55*
Wostenholm's .....₩ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple, Rubber Tip.....*gro.$1.25@1.40*
Carriage, Jap., all sizes.....*gro. 40@45¢*
Door, Mineral.....*doz. 65@70¢*
Door, Por. Jap'd.....*doz. 70@75¢*
Door, Por. Nickel..*doz. $2.05@2.15*
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—

See *Belting, Leather—*

Ladders, Store, &c.—

Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....20%
P. S. & W.....40&10%
Reading 60%

Lanterns—Tubular—

Regular, No. 0.....*doz.$4.35@4.50*
Side Lift, No. 0.....*doz.$4.60@4.75*
Hinge Globe, No. 0.doz.$4.60@4.75
Other Styles.....*40@40&10%*

Bull's Eye Police—

3-inch .....*$4.25@4.50*

Latches— Thumb—

Roggin's Latches, with screw..*doz. 35@40¢*

Door—

Allith Mfg. Co., Reliable and Alligator, 50%; Reliable Cold Storage, 50%
Cronk & Carrier Mfg. Co., No. 101, ₩ doz. $2.30
Richards' Bull Dog, Heavy, No. 125 .....50&5%
Richards' Trump, No. 127.....$1.50

Leaders, Cattle—

Small.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Leathers, Pump—

See *Pumps—*

Lifters, Transom—

R. & E.....10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.50*	*2.25*	*2.00*
75 feet	*$2.10*	*1.80*	*1.65*

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₩ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75
Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50 .....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines White Cotton.....20%
Shade Cord, Cotton or Linen....20%

Locks— Cabinet—

Cabinet Locks.....*33⅓%*

Door Locks, Latches, &c —

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and Brass .....75&10%

Sash, &c.—

Ives' Patent:
Bronze and Brass, 55&5%; Crescent, 60%; Iron, 60%; Window Ventilating, 40&20%; Robinson Pat. Ventilating Sash Lock, 33⅓%.
Pullman Patent Ventilating Lock..25%
Reading Sash Locks.....40%

Machines—Boring—

Com. Upr't, without Augers, $2.00@2.25
Com. Angl'r, without Augers, $2.25@2.50
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....25&7½%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90

Corking—

Reisinger Invincible Hand Power.... ₩ doz. $48.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake 20%
Moore's Cyclon. High Speed Chain Hoist 25%

Ice Cutting—

Chandler's 12½%

Washing

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$57.00
Champion Rotary Banner No. 1	$57.00
Standard Champion No. 1	$50.00
Standard Perfection	$27.00
Cincinnati Square Western	$33.00
Uneeda American, Round	$33.60

Mallets—

Hickory .....*45&5@50%*
Lignumvitæ .....*45&5@50%*
Tinners' Hickory and Applewood .....*doz. 45&5@50%*

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Acme Flexible Steel.....50%
Elastic Steel (W. G. Co.), new list.50%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side.....50&10%
Swift, Lane Bros. Co.....30%

Motors, Water—

Divine's Red Devil.....30%
Lippincott's 30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted
Cheapest, 10-in., $2.00; advance 10¢ for each size.
Cheap, 10-in., $2.25; advance 15@ 20¢ for each size.
Better Grade, 10-in., $3.00; advance 25¢ for each size.

	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental 60%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania 60%
Pennsylvania, Jr., Ball Bearing, 50&10&5%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel.....70%
Style B, Low Wheel.....70%
Style C, High Wheel, spcl. list, 70&10%
Style D, High Wheel, spcl. list..70%
Philadelphia:
Styles M., S., C., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.40%
Horse .....40&5%
Pony .....40&5%
36-in. Horse.....30&10%
Eagle Horse.....30&5%
I. X. L. Horse.....50%

Nails—

Wire Nails and Brads, Miscellaneous .....*85&5@85&10%*
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

	Nos. 6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Coleman	13	12	12	11	11	.....net
New Haven..	23	21	20	19	18	...40&5%
Livingston	19	18	17	16	16	.....10%

Western .....₩ lb 8½¢
Jobbers' Special Brands.....*per lb.9@10¢*

Picture—

	1½	*2*	*2½*	*3*	*in.*
Brass H'd	*.45*	*.55*	*.60*	*.70*	*.. gro*
Por. Head	*.. 1.10*	*1.10*	*1.10*		*.. gro*

Upholsters—

Brass *30%*
Plated .....*30&10%*

Nippers—

See *Pliers and Nippers.*

Nuts— *Blank or Tapped.*

Cold Punched:	*Off list.*
Square	*5.20¢*
Hexagon	*5.80¢*
Square, C., T. & R.	*5.60¢*
Hexagon, C., T. & R.	*6.30¢*
Hot Pressed:	
Square	*5.80¢*
Hexagon	*6.30¢*

Oakum—

Best .....*lb., 6½¢*
U. S. Navy.....*lb., 6¢*
Navy .....*lb., 5¢*
Plumbers' Spun Oakum..*2¾@3¢*

Oil Tanks—See *Tanks, Oil.*

Oilers—

Steel, Copper Plated.....*75%*
Chase or Paragon:
Brass and Copper.....*50&10%*
Zinc .....*65&10%*
Railroad .....*60&10&10%*
Malleable, Hammers Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70&70&10%
Railroad Oilers, &c.....60@60&10%
Maple City Mfg. Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*

Sprague, Iron Handle....*30@35¢*
Sprague, Wood Handle...*35@40¢*
Sardine Scissors.....*$1.75@$3.00*
Yankee Can and Bottle Opener, ₩ doz., net, $0.75; Little Gem, ₩ doz., net.....$0.65

Egg—

Hartigan Nickel Plate, ₩ doz., $2.00; Silver Plate, $4.00.

Packing—

Asbestos Packing. Wick and Rope, any quantity.....*20¢*

Rubber—

(Fair quality goods.)

Sheet, C. I......*11@12¢*
Sheet, C. O. S......*11@12¢*
Sheet, C. B. S......*12@13¢*
Sheet, Pure Gum.....*40@45¢*
Sheet, Red.....*40@50¢*
Jenkins' '96, ₩ lb. 80¢.....25%

Miscellaneous—

American Packing...*lb. 7@10 ¢*
Cotton Packing.....*lb. 16@25 ¢*
Italian Packing.....*lb. 9@12½¢*
Jute .....*lb. 4@ 4½¢*
Russia Packing.....*lb. 8@11 ¢*

Pails, Water, Well, &c.—

See *Buckets.*

Pans— Dripping—

Standard List.....*65&7½@70%*
Edwards, Royal Blue.....65&7½%

Fry—

Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz.	*$1.75*	*2.25*	*2.80*	*3.15*

Paper—Building Paper

Asbestos: lb.
Roll Board or Building Felt, 5 to 30 lb., per 100 sq. ft. 2½@3¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb. per 100 sq. ft......*3½¢*
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in......*3¢*
Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll .....*48@58¢*
Medium weight, 30 lbs. to roll, ...*56@70¢*
Heavy weight, 40 lbs. to roll ..*75@78¢*
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....*$54.50*
Red Rope Roofing, 250 sq. ft. per roll.....*$1.75*

Tarred Paper—

1 ply (roll 400 sq. ft.), ton.....*$34.00@$38.00*
2 ply, roll 108 sq. ft......*65¢*
3 ply, roll 108 sq. ft......*88¢*
Slater's Felt (roll 500 sq. ft.).*80¢*

Sand and Emery—

Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth...*25%*
Emery Paper and C'h..50&10@60%

Parers— Apple—

Goodell Co.:
Family Bay State.....₩ doz. $15.00
Improved Bay State.....₩ doz. $36.00
New Lightning.....₩ doz. $7.00
Turn Table '98.....₩ doz. $6.00
White Mountain.....₩ doz. $5.00
Bonanza Improved.....each $7.50
Dandy .....each $10.00
Eureka Improved.....each $20.00
New Century.....each $20.00
Ranger .....each $25.00
Livingston Nail Co.:
Daisy .....₩ doz. $4.00
Little Star.....₩ doz. $5.00
Rocking Table.....₩ doz. $6.20
Reading Hardware Co.:
Advance .....₩ doz. $4.00
Baldwin .....₩ doz. $4.00
Reading 72.....₩ doz. $3.25
Reading 78.....₩ doz. $6.25

Potato—

Saratoga .....₩ doz. $7.00
White Mountain.....₩ doz. $6.00

Picks and Mattocks—

(List Jan., 1903.)

List .....*70¢&10@70¢&10¢&10%*
Cronk's Handled Garden Mattock, ₩ doz., No. 3, $2.60; No. 3, $6.10.

Pinking Irons—
See *Irons, Pinking.*

Pins, Escutcheon—
Brass .....50@50&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—
Standard 2-6 in.....60&5@—%
Extra Heavy, 2-6 in..70&5@—%
Fittings, Standard and Heavy, 70&10@75%

Pipe, Merchant—

	Consumers, Carloads.			
	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
	%	%	%	%
⅛ & ¼ *in*...	64	48	62	..
⅜ *in*.....	66	52	64	50
½ *in*.....	68	56	66	54
¾ *to 6 in*...	72	62	70	60
7 to 12 in....	69	54	67	52

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class 87%
Second-class 90%

Pipe, Stove—

	Per 100 joints.	
Edwards' Nested:	C. L.	L. C. L.
5 in., Standard Blue	$6.25	$7.25
6 in., Standard Blue	6.75	7.75
7 in., Standard Blue	7.75	8.75
5 in., Royal Blue	7.00	8.00
6 in., Royal Blue	7.50	8.50
7 in., Royal Blue	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color	$6.15	$7.15
6 in., Uniform Color	6.65	7.65
7 in., Uniform Color	7.65	8.65

Planes and Plane Irons—
Wood Planes—
Bench, first qual.....30@30&10%
Bench, second qual...40@40&10%
Molding .....25@25&10%
Chapin-Stephens Co.:
Bench, First Quality.....30%
Bench, Second Quality.....40%
Molding and Miscellaneous.....25%
Toy and German.....30%
Union 60%

Iron Planes
Chaplin's Iron Planes.....50&10%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '06.....25%
Buck Bros.....3
Chapin-Stephens Co.....25%
Union 50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—
Kohler's Eclipse.....₱ doz. $8.00

Plates—
Felloe .....lb. 4@4¼¢

Pliers and Nippers
Button Pliers....75&5@75&10&5%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.

Gas Pipe.. 7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's 60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&5@40&10&5%
P., S. & W. Tinners' Cutting Nippers 40%
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10%
Extension Sights.....30@30&10%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels....60&10%
Disston's Pocket Levels.....60&10%
Stanley's Duplex.....50%
Woods' Extension.....33⅓%

Points, Glaziers'—
Bulk and 1-lb. papers....lb. 9 ¢
½-lb. papers.....lb. 9½¢
¼-lb. papers.....lb. 10 ¢

Police Goods—
Manufacturers' Lists...25@25&5%
Tower's 25%

Polish—Metal, Etc—
Prestoline Liquid, No. 1 (¼ pt.), ₱ doz., $3.00; No. 2 (1 qu.), $9.00..40%
Prestoline Paste.....60%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz. 50¢; ₱ gro. $4.50; ½ lb boxes, ₱ doz. $1.25; 1 lb boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz., $1.25.
Barkeepers' Friend Metal Polish, ₱ doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, ₱ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ₱ doz. 75¢
Black Jack Paste, ¾ lb cans, ₱ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon's, ₱ gr. $5.75.....10%
Dixon's Plumbago.....₱ lb 8¢
Fireside .....₱ gr. $2.50
Gem, ₱ gr. $4.50.....10%
Japanese .....₱ gr. $3.50
Jet Black.....₱ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ₱ doz. $1.50

Poppers, Corn—
1 qt. Square..doz. $0.80; gro. $8.75
1 qt. Round..doz. $0.90; gro. $10.00
1½ qt. Square..doz. $1.00; gro. $11.00
2 qt. Square..doz. $1.25; gro. $13.50

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled .....35&10%
Tinned .....30&10%

Powder—
In Canisters:
Duck, 1 lb.....each 45¢
Fine Sporting, 1 lb....each 75¢
Rifle, ½-lb.....each 15¢
Rifle, 1-lb.....each 25¢
In Kegs:
12½-lb. kegs.....$3.50
25-lb. kegs.....$4.50
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Presses—
Fruit and Jelly—
Enterprise Mfg. Co.....20@25%
Seal Presses—
Morrill's No. 1, ₱ doz., $20.00.....50%

Pruning Hooks and Shears
See *Shears.*

Pullers, Nail—
Cyclops 60%
Miller's Falls, No. 3, ₱ doz., $12.00..33⅓&10%
Morrill's No. 1, Nail Puller, ₱ doz. $20.00 .....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
The Scranton Co. Case Lots:
No. 2½ (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B.....70%
Giant 50%
Staple Pullers, Utica and Davison 60%

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye, doz., ¼ in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz....	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz....	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.....	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Sash Pulleys—
Common Frame; Square or Round End, per doz, 1¾ and 2 in.....17@20¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in....20@22¢
Acme. No. 35..1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle .....50&10%
Wrought Steel Eagle.....17@20¢
Top Notch, Electrically Welded, Nos. 3 and 4.....19¢
Fox-All-Steel, Nos. 3 and 4, 3 in.. ₱ doz. 50%
Grand Rapids All Steel Noiseless..50%
Niagara, No. 25, 1¾ in., 19¢; 2 in., ...20½¢
No. 26, Troy..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26..1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—
Cistern 60%
Pitcher Spout.....75&5@75&10%
Wood Pumps, Tubing, &c....60%
Barnes Dbl. Acting (low list)....40&5%
Barnes Pitcher Spout.....15&10%
Contractors' Rubber Diaphragm No. 2 B. & L. Block Co.....$16.00
Daisy Spray Pump.....₱ doz. $6.50
Flint & Walling's Fast Mail Hand, (low list).....50%
Flint & Walling's Fast Mail (low list) 50%
Flint & Walling's Tight Top Pitcher. 75&10%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50.....30%
Myers' Pumps (low list).....40&5%
Myers' Power Pumps.....40&5%
Myers' Spray Pumps.....40&5%

Pump Leathers—
Plunger and Valve Leathers—Per gro.:

No.....	*1*	*2*	*3*	*4*	
	$5.00	*6.00*	*7.00*	*8.00*	
Cup Leathers—Per 100:					
Inch....	2½	3	3½	4	50%
	$5.00	*7.00*	*9.00*	*12.00*	

Punches—
Saddlers' or Drive, good..... doz. 50@75¢
Spring, single tube, good quality $1.75
Revolving (4 tubes)....doz. $3.50
Beans & Call Co.'s Cast St'l Drive.50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Tinners' Hollow, P., S. & W. Co..40%
Tinners' Solid, P., S. & W. Co., ₱ doz., $1.44.....40%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron.... 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢.....30%
Allith Mfg. Co.: Reliable Hanger Track 50%
Cronk's:
Double Braced Steel Rail..₱ ft. 3¼¢
O. N. T. Rail.....$3.12
Griffin's:
xxx, ₱ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ₱ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ₱ 100 ft. $3.45
O. N. T., ₱ 100 ft., 1 in., $3.00; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in.....₱ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ₱ 100 ft., $7.50; 1¼ x 3-16 in., $8.75.....55&7½%
McKinney's:
Hinged Hanger Track, ₱ ft., 11¢, 60&5%
1 x 3-16 Track.....55&7½%
Myers' Stayon Track.....60&5%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00, 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ₱ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—
NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Cronk's:
Steel Garden: Champion, 75%; Ideal, 80%; Victor.....80&25%
Queen City Lawn, ₱ doz., 20 teeth, $2.85; 24, $3.00.....net
Anticlog Lawn, ₱ doz.....$4.00
Malleable Garden.....70&10%
Ideal Steel Garden, ₱ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Lawn Queen, 20-tooth....₱ doz. $3.15
Lawn Queen, 24-tooth....₱ doz. $3.25
Paragon, 20-tooth.....₱ doz. $2.70
Paragon, 24-tooth.....₱ doz. $2.75
Steel Garden, 14-tooth....₱ doz. $2.40
Malleable Garden, 14-tooth, ₱ doz. $2.00@2.25

Rasps, Horse—
Disston's 75%
Heller Bros.'.....70&5@70&10&5%
Liveright Bros.' Gold Medal.70&10@75%
McCaffrey's American Standard, 60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—
Liana Bo-ras-ic.....60%
Fox Razors, ₱ doz., No. 42, $60.00; No. 44, $20.00; No. 82, Platina, $25.00. } 10&40%
Red Devil.....65%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P, 33⅓%; 2904 PN, 33⅓%; 0624 N, 33⅓%; 02084 N, 33⅓%; 002904 PN, 33⅓%; 802 N, 33⅓%
966 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed 70%
White Porcelain Enamel..50&10%
Solid Brass or Bronze Metal.40%

Revolvers—
Single Action.....95¢@$1.00
Double Action, except 44 cal..$2.00
Double Action, 44 caliber....$2.00
Automatic $4.00
Hammerless $4.50

Riddles, Hardware Grade
16 in.....per doz. $2.50@$2.75
17 in.....per doz. $2.75@$3.00
18 in.....per doz. $3.00@$3.25

Rings and Ringers—
Bull Rings—

	2	2½	3 inch.
Steel	$0.70	0.75	0.80 doz.
Copper	$1.10	1.25	1.65 doz.

Hog Rings and Ringers—
Hill's Rings, gro. boxes.$4.25@$4.50
Hill's Ringers, Gray Iron, doz., 60@75¢
Hill's Ringers, Malleable Iron doz..80@95¢
Blair's Rings..per gro.$5.00@$5.50
Blair's Ringers...per doz.75@90¢

Rivets and Burrs—
Copper .....50@50&5%
Carriage, Coopers', Tinners, &c.:
Black .....70&10%
Metallic Tinned.....70%

Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 50 count, 23@25¢; *Tin boxes, 100 count,* 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; *100 count,* 51@58¢.

Rollers—
Cronk's Stay, No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60.....$0.75
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%

Rope—
Manila, 7-16 in. diam. and larger:
Pure .....lb., 10@10¼¢
Sisal, 7-16 in. diam. and larger:
Pure .....lb., 7½@7¾¢
Sisal, 7-16 in. diam. and larger: lower grade.....lb., 6½@7¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed .....lb., 6½@6¾¢
Pure .....lb., 7½@7¾¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred:
Mixed .....lb., 5@5½¢
Pure .....lb., 6½¢
Cotton Rope:
Best, ¼-in. and larger...18@20¢
Medium, ¼-in. and larger.16@17¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope:
Thread, No. 1, ¼-in. & up, lb., 6¼¢
Thread, No. 2, ¼-in. & up, lb., 5¾¢

Wire Rope—
Galvanized .....37½&2½%
Plain .....45&2½%

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal.....20%

Rules
Boxwood .....60@60&10%
Ivory .....35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory .....25@25&10%
Miscellaneous .....50@50&10%
Stephens' Combination.....55%
Stationers' .....50@50&10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....60&10%
Lufkin's Lumber.....50&10%
Unson Nut Co.:
Boxwood .....60@60&10%
Ivory .....35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—
See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—
See *Sets, Saw.*

Saw Tools—
See *Tools, Saw.*

Saws—

Atkins':
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 35%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Wood Saws ..... 40&10%

Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%

Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30@10&10%

Disston's:
Circular, Solid and Ins'ted Tooth 60%
Band, 2 to 18 in. wide 60%
Band, ¾ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 50%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 187, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 30%

C. E. Jennings & Co.'s:
Back Saws 16⅔%
Butcher Saws ..... 25&7⅛%
Compass and Key Hole Saws ..... 33⅓&7⅛%
Framed Wood Saws ..... 25&7⅛%
Hand Saws 12½%
Wood Saw Blades ..... 33⅓&7⅛%

Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%

Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35@40%

Peace & Richardson's Hand Saws 30%

Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws 30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws 45%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 40%
Compass, Key Hole, &c. ..... 25@25&7½%
Wood Saws ..... 40&7½%

Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A A 25%
Disston's:
Concave Blades 25%
Keystone Blades 35%
Hack Saw Frames 30%
Simonds File Co. 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete ..... 40&7½%
Goodell's Hack Saw Blades ..... 40&10%
Griffin's Hack Saw Frames ..... 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades ..... 30&10&5%
Sterling Hack Saw Frames ..... 30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00 ..... 10%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames 40%
Whitaker Mfg. Co.:
National Hand Blades 40%
National Hand Frames ..... 30&5%
National Power Blades ..... 30&10%

Scroll—

Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00 ..... 15&10%

Scales—

Union Platform, Plain, $2.10@2.20
Union Platform, Stpd. $2.20@2.30
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales 50%
The Standard Portables 40%
The Standard R. R. and Wagon ..... 50&10%

Scrapers—

Box, 1 Handle ..... doz. $2.00@2.25
Box, 2 Handle ..... doz. $2.50@2.60
Ship .... Light, $2.00; Heavy, $4.50
Chapin-Stephens Co., Box ..... 30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood ..... 20@20&10%
Hand, Wood ... 70&10@70&10&10%
Chapin-Stephens Co., Hand ..... 70@70&10&2½%

Coach, Lag and Hand Rail—

Lag, Cone Point ... 80&5@80&10%
Coach, Gimlet Point .. 80@80&5%
Hand Rail ..... 70&10@75%

Jack Screws—

Standard List ..... 70&10@75%
Millers Falls ..... 50&10&10%
Swett Iron Works ..... 70@75%

Machine—

Cut Thread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head ..... 40@40&10%
Rolled Thread, F. H. or R. H., Iron ..... 75&10%
F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%

Set and Cap—

Set (Iron) ..... 75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap ..... 70&10&7½%
Hex. Hd. Cap ..... 70&10&7½%
Rd. Hd. Cap ..... 50&7½%
Fillister Hd. Cap ..... 60&7½%

Wood—

List July 23, 1903.
Flat Head, Iron ..... 87½&5@.. %
Round Head, Iron ..... 85&5@.. %
Flat Head, Brass ..... 80&5@.. %
Round Head, Brass .. 77½&5@.. %
Flat Head, Bronze .... 75&5@.. %
Round Head, Bronze .. 72½&5@.. %
Drive Screws ..... 87½&5@.. %

Scroll Saws—

See *Saws, Scroll.*

Scythes—

	Per doz.
*Grass, No. 1, Plain	$7.00@7.50
*Clipper, Bronzed Webb ..	$7.25@7.75
*No. 3 Clipper, Pol'd Webb ..	$7.50@8.00
*No. 6 Clipper and Solid Steel,	$7.75@8.25
*Bush, Weed and Bramble, Nos. 11, 12 and 13	$7.25@7.75
*Grain, No. 1	$9.00@9.50
*Bronzed Webb, No. 1 ...	$9.25@9.75
*Nos. 3 and 4 Clipper, Grain ..	$9.50@10.00
*Solid Steel, No. 6	$10.00@10.50

Seeders, Raisin—

Enterprise ..... 25@30%

Sets—Awl and Tool—

Fray's Adj. Tool Handles, Nos. 1, $12; 2, $16; 3, $12 ..... 50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 .. 20&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ₩ doz sets $9.00

Sets, Nail—

Octagon ..... gro. $3.50@3.75
Buck Bros. 27½%
Cannon's Diamond Point, ₩ gro, $12, 40&10%
Mayhew's ..... ₩ gro. $9.00
Snell's Corrugated, Cup Pt. ... 40&10%
Snell's Knurled, Cup Pt. ..... 40&10%
Victor Knurled Cup Pt. ... ₩ gro. $7.50

Rivet—

Regular list ..... 75@75&10%

Saw—

Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1 ..... $15.00
Nos. 3 and 4, Cross Cut $20.60
No. 5, Mill $30.00
Nos. 10, 11, 95 ..... $15.60
No. 1 Old Style $10.00
Special $16.25
Giant Royal Cross Cut ..... ₩ doz. $8.00
Royal, Hand ..... ₩ doz. $4.50
Taintor Positive ..... ₩ doz. $4.75

Shaving—

Fox Shaving Sets, No. 30 ..... ₩ doz., net, $24.00
Smith & Hemenway Co.'s 75%

Sharpeners, Knife—

Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ₩ doz. $1.50
Mounted Kitchen Sand Stone, ₩ doz. $1.50
Natural Grit Carving Knife Hones, ₩ doz. $3.00
Quick Cut Emery Carving Knife Hones, ₩ doz. $1.50
Quick Edge Pocket Knife Hones, ₩ doz. $2.00

Skate—

Smith & Hemenway Co., Eureka .. 50%

Shaves, Spoke—

Iron ..... doz. $1.25
Wood ..... doz. $2.00
Bailey's (Stanley R. & L. Co.) 45%
Chapin-Stephens Co. ..... 30@30&10%
Goodell's, ₩ doz. $9.00 ..... 15&10%

Shears—

Cast Iron	7	8	9 in.	
*Best	$16.00	18.00	20.00	gro.
*Good	$13.00	15.00	17.00	gro.
*Cheap	$5.00	6.00	7.00	gro.

Straight Trimmers, &c.:
Best quality Jap .... 70@70&10%
Best quality, Nickel .. 60@60&10%
Tailors' Shears ..... 40@40&10%
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list ..... 30&10&5%
Grass ..... 50&10%
Horse or Mule ..... 50&10%
J. Wiss & Sons Co.:
Best Quality Jap'd ..... 60&10%
Best Quality Nickeled ..... 50&10%
Tailors' 25%

Tinners' Snips—

Steel Blades ..... 30&5@30&10%
Steel Laid Blades .... 40&10@50%
Forged Handles, Steel Blades, Berlin 50%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s 6½ to 10 in. ..... 33⅓&7½%
Niagara Snips 40%
P. S. & W. Forged Handles, 25%:
W. R. W. ..... 40&10%
J. Wiss & Sons Co.:
Wiss Forged Steel 25%

Pruning Shears—

Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ₩ doz. $18.00 ..... 25%
Disston's Pruning Hook only, ₩ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades 40%
P. S. & W. Co. ..... 40&10%
Columbian Cutlery Co.:
Hedge, Wilcut Brand ..... 60&10%
Lawn and Border, Wilcut Brand. 60&10%

Sheaves—Sliding Door—

Reading 40%
R. & E. list 15%

Sliding Shutter—

Reading list 40%
R. & E. list 10%

Shells—Shells, Empty—

Brass Shells, Empty:
Climax, 10 and 12 gauge ..... 65&10%
Club, Rival, 65&5%; First Quality, 60&5%

Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade, 25&5%
Union, League, 12 and 12 gauge; Rival Grade 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge ..... 20&5%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade .. 20%

Shells, Loaded—

Loaded with Black Powder .. 40%
Loaded with Smokeless Powder, medium grade ..... 40&5%
Loaded with Smokeless Powder, high grade ..... 40&10&10%
Union Metallic Cartridge Co.:
New Club, Black Powders 40%
Nitro Club, Smokeless Powders. 40&5%
Arrow, Smokeless Powders. 40&10&10%
Winchester:
Smokeless Repeater Grade ..... 40&5%
Smokeless Leader Grade ... 40&10&10%
Black Powder 40%

Shingles, Metal— Per Sq.

Edwards Mfg. Co.:	Painted.	Galv.
14 x 20	$4.25	$5.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:
Dixie, 14 x 20 in. ... $4.25 — $5.50
Dixie, 10 x 14 in. .... 4.50 — 6.00
Dixie, 7 x 10 in. .... 5.00 — 6.75

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron ..... per keg. $4.10
Steel ..... per keg. $3.85
Burden's, all sizes ..... ₩ keg $3.90

Shot—

	25-lb. bag.
*Drop, up to B	$1.85
*Drop, B and larger	2.10
*Buck	2.10
*Chilled	2.10
*Dust	2.30

Shovels and Spades—

Association List, Nov. 15, 1902 .. 40%
Avery Stamping Co. 40%

Snow Shovels—

Long Handle ..... $3.25@$3.50
Wood and Mail, D. Handle, $3.75@$4.00

Sieves and Sifters—

Hunter's Imitation ..... gro. $9.50@10.00
Hunter's Genuine ..... per gro. $12.00@12.50

Sifters, Ash—

Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each, $3.25; ₩ doz. $39.00

Sieves, Seamless Metallic

	Per dozen.			
Mesh	14	16	18	20
*Iron Wire	$1.05	1.05	1.10	1.20
*Tinned Wire	$1.15	1.15	1.20	1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested .... doz. $0.90@0.95
Mesh 20, Nested .... doz. $1.00@1.05
Mesh 24, Nested .... doz. $1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:
12 x 12 to 22 x 36 in. 60%
20 x 40 to 24 x 50 in. 50%
24 x 60 to 24 x 120 in. 30%
Barnes' low list:
Up to and including 20 x 36 in. 50&5%
20 x 40 to 24 x 50 in. 45%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—

Cast Iron ..... 70@75&10%
Steel ..... 40@45%

Slates, School—

Factory Shipments.
"D" Slates ..... 50@50&10%
Eureka, Unexcelled Noiseless .. 60&5 tens
Victor A, Noiseless .60&5 tens 45%

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German ..... 40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan 40%
Jockey 25%

Snaths—

Scythe ..... 55@60%

Snips, Tinners—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality ..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co.:
1847 Rogers Bros., 40&10%; Rogers & Hamilton ..... 50&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous

German Silver ..... 60@60&5%

Tinned Iron—

Teas ..... per gro. 50@55¢
Tables ..... per gro. $0.90@$1.00

Springs—Door—

Bardsley's Spring and Check 40%
Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman Door and Gate 10%
Reliance (Coil) ..... 40&10%
Star (Coil) 30%
Torrey's Rod, 39 in. ..... ₩ doz. $1.10

Carriage, Wagon, &c.—

1¼ in. and Wider:	Per 100 lb.
*Black	$4.75@$5.00
*Half Bright	$4.75@$5.00
*Bright	$5.25@$5.50

Painted Seat Springs:
1½ x 2 x 26 .... per pair .45@47¢
1½ x 3 x 28 .... per pair .63@68¢

Sprinklers, Lawn—

American Foundry & Mfg. Co.:
Cactus, 65%; Japanese, 70%; National, ₩ doz. $12.00
Enterprise ..... 25@30%
Philadelphia No. 1, ₩ doz. $12; No. 2, $15; No. 3, $20 ..... 30%

Squares—

Nickel plated .. } List Jan. 5, 1900.
Steel and Iron. } 80@80&5%
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Diston's Try Squares and Bevels, Rosewood Handle, 60&10%; Iron Stock and Bevel 15%

Squeezers, Lemon

Wood, Porcelain Lined:
Cheap ..... doz. $1.00
Good Grade ..... doz. $1.25
Tinned Iron ..... doz. $0.75@1.25
Iron, Porcelain Lined ... doz. $1.75

Staples—

Barbed Blind ..... 85&5@85&10%
Electricians' ..... 80&10&10@85%
Fence Staples, Plain, $2.15; Galvanized $2.45
Poultry Netting Staples ..... per lb. 3¼@3½¢

Steels, Butchers'—

Dick's 30%
Foster Bros. 30%

Steelyards— .... 30@30&10%

Stocks and Dies—

Blacksmiths' ..... 50@50&10%
Curtis Rev'ble Ratchet Die Stock .. 25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plates 25%

Stoners, Cherry—

Enterprise ..... 25@30%

Stones—Oil, &c.

Pike Mfg. Co., 1907 list:	₩ lb
Arkansas St. No. 1, 3 to 6¼ in.	$2.00
Arkansas St. No. 1, 6½ to 8 in.	$3.50
Arkansas Slips No. 1	$4.00
Lily White Washita, 4 to 8 in.	60¢
Rosy Red Washita, 4 to 8 in.	60¢
Washita St., Extra, 4 to 8 in.	50¢
Washita St., No. 1, 4 to 8 in.	40¢
Washita St., No. 2, 4 to 8 in.	25¢
Lily White Slips	90¢
Rosy Red Slips	90¢
Washita Slips, Extra	80¢
Washita Slips, No. 1	70¢
Washita Slips, No. 2	40¢
India Oil Stones (entire list)	33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit	40%
Quickcut Emery and Corundum Axe Stone, Double Grit	30%
Quickcut Emery Rubbing Bricks	40%
Hindostan No. 1, R'g'lar.	₩ lb 8¢
Hindostan No. 1, Small	₩ lb 10¢
Axe Stones (all kinds)	
Turkey Oil Stones, Extra, 5 to 8 in.	₩ lb 80¢
Queer Creek Stones, 4 to 8 in.	20¢
Queer Creek Slips	40¢
Sand Stone	6¢

Scythe Stones—

Pike Mfg. Co., 1901 list:
Black Diamond S. S. ℔ gro. $12.00
Lamoille S. S. ℔ gro. $11.00
White Mountain S. S. ℔ gro. $9.50
Green Mountain S. S. ℔ gro. $7.00
Extra Indian Pond S.S. ℔ gro. $8.00
No. 1 Indian Pond S.S. ℔ gro. $7.50
No. 2 Indian Pond S.S. ℔ gro. $5.00
Leader Red End S. S. ℔ gro. $5.00
Quick Cut Emery.... ℔ gro. $10.00
Pure Corundum..... ℔ gro. $18.00
} 33⅓%
Crescent $7.00
Emery Scythe Rifles, 2 Coat. $8.80
Emery Scythe Rifles, 3 Coat. $11.00
Emery Scythe Rifles, 4 Coat. $13.20
Balance of 1904 list 33⅓%
Lectro (Artificial), ℔ gro., $12.00 ..... 33⅓%
Lightning (Artificial), ℔ gro., $18.00 ..... 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers..... ℔ gro. $9.00

Stops— Bench—

Millers Falls..... 15&10%
Morrill's, ℔ doz., No. 1, $10.00..... 50%
Morrill's, No. 2, $12.50..... 50%

Door—

Chapin-Stephens Co..... 50@50&10%

Plane—

Chapin-Stephens Co..... 25%

Straps— Box—

Acme Embossed, case lots..20&10&10%
Cary's Universal, case lots....20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points..doz. 55¢
All Steel Socket...doz. $2.00@2.25
Excelsior Stretcher and Tack Hammer Combined, ℔ doz. $6.00..... 20%

Stuffers, Sausage—

Enterprise Mfg. Co..... 25@25&7½%
National Specialty Co., list Jan. 1, 1902 ..... 50&5%
P., S. & W. Co..... 40&10&5%

Sweepers, Carpet—

Bissell Carpet Sweeper Co.:	℔ doz.
Superba, Crotch Mahogany	$36.00
Triumph, Fancy Veneers	$33.00
Parlor Queen, Fig. Rosewood	$30.00
Elite, Hungarian Ash	$29.00
Am. Queen, Fig. Mahogany	$27.00
Ideal, Bird's-Eye Maple	$25.00
Grand Rapids, Nickel, Japan	$24.00; $22.00
Standard, Nickel, $22.00; Japan	$20.00
Crown Jewel, Nickel, $21.00; Jap.	$19.00
Crystal, Glass Top	$36.00
Grand, 17 in. wide	$36.00
Parlor Grand	$48.00
Club, 24 in. wide	$54.00
Hall, 28 in. wide	$60.00

NOTE.—Rebates: 50c per dozen on three dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks...90&40%
American Cut Tacks.....90&40%
Swedes' Cut Tacks.....90&40%
Swedes' Upholsterers'.....90&5%
Gimp Tacks.....90&50%
Lace Tacks.....90&50%
Trimmers' Tacks.....90&40%
Looking Glass Tacks.....65%
Bill Posters' and Railroad Tacks, 90&50&10%
Hungarian Nails.....80&20%
Finishing Nails.....70%
Trunk and Clout Nails...80&10%

NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks..... 90&6 tens@—%
See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.:		
Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$3.50	$4.00
110	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin ..50@—%
Patent Leather.....25@30&5%
Steel ..... 33 1-3&5%
Chesterman's ..... 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin.....40&10@50%
Metallic ..... 30@30&5%
Patent Bend, Leather....25&5@25&10%
Pocket ..... 40@40&5%
Steel ..... 33⅓@33⅓%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1036L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c......30@33⅓%

Ties, Bale—Steel Wire—

Single Loop.....82½&10%
Monitor, Cross Head, &c..70&2½%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White..... 20@20&5%

Haying—

Myers' Hay Tools..... 45%

Miniature—

Smith & Hemenway Co.'s, Davidson, ℔ doz., Nickel Plated, $1.50; Gold Plated..... $2.00

Saw—

Atkins' Cross Cut Saw Tools....35&5%
Simonds' Improved..... 33⅓%
Simonds' Crescent..... 25%

Ship—

L. & I. J. White..... 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro.....$11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida.....75&10%
Newhouse ..... 45@45&5%
Hawley & Norton..... 65%
Victor ..... 75@75&10%
Oneida Community Jump..... 40%
Hector ..... 75@75&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, ℔ doz., $13.25..$11.50 doz.
No. 3, Rat, ℔ doz., $6.50... $5.75 doz.
No. 3½, Rat, ℔ doz., $5.25. $4.70 doz.
No. 4, Mouse, ℔ doz., $3.85. $3.00 doz.
No. 5, Mouse, ℔ doz., $3.00. $2.25 doz.
Oneida Community:
Out o' Sight, Mouse, ℔ doz....$0.60
Out o' Sight, Rat, ℔ doz..... 1.25
Easy Set, Mouse, ℔ doz..... .35
Easy Set, Rat, ℔ doz..... 1.00
Wood Choker, Rat, ℔ doz. holes. .12
Premier Tin Choker, 5 hole, ℔ doz. traps..... .75

Trowels—

Disston Brick and Pointing..... 25%
Disston Plastering..... 20%
Disston "Standard Brand" and Garden Trowels..... 30%
Kohler's Steel Garden Trowels, ℔ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels.. ℔ gro. $6.00
Woodrough & McParlin, Plastering. 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern..... 50&10%
Western Pattern..... 60&10%
Handy Trucks..... ℔ doz. $16.00
Grocery ..... ℔ doz. $15.00
McKinney Trucks.....each, net $10.00
Model Stove Trucks..... ℔ doz. $18.50

Tubs, Wash—

M'f'gr's list, price per gross.

No.	0	1	2	3
Galvanized	$67	$79	$89	$99

10&7½&5&5%

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls..21@23¢
No. 12, ¼ and ½-lb. Balls..19@21¢
No. 18, ¼ and ½-lb. Balls..16@18¢
No. 24, ¼ and ½ -lb. Balls. 13½@17½¢
No. 36, ¼ and ½-lb. Balls..15@17¢
Chalk Line, Cotton Balls ..... *2½@29¢*
Cotton Mops, 6, 9, 12 and 18 to doz..... *8½@19¢*
Cotton Wrapping, 5 Balls to lb., according to quality..13½@19¢
American 2-Ply Hemp, ¼ and ½-lb. Balls..... *12½@15¢*
American 3-Ply Hemp, ¼-lb. Balls ..... *13½@16¢*
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine)...*7½@9¢*
India 3-Ply Hemp, 1-lb. Balls 7½@9¢
India 3-Ply Hemp, 1½-lb. Balls, 7@8½¢
2, 3, 4 and 5-Ply Jute, ½ lb. Balls ..... *9@11¢*
Mason Line, Linen, ½-lb. Bls.17¢
No. 2½ Mattress, ¼ and ½-lb. Balls, according to quality, 50@60¢
Wool, 3 to 6 ply....B 6¢; A 7½¢

Vises—

Solid Box.....50&5@50&10&5%

Parallel—

Athol Machine Co.:
Simpson's Adjustable..... 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co..... 40%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00.
Fulton Mach. & Vise Co.:
Reed, Swivel..... 25%
Star, Solid Jaw..... 40%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&5@70%
Lewis Tool Co.:
Adjustable Jaw..... 30%
Monarch, 50%; Solid Jaw..... 50%
Massey Vise Co.:
Clincher 40%
Perfect, 15%; Lightning Grip..... 15%
Merrill's 20%
Millers Falls Oval Slide Pattern. 60&10%
Parker's:
Victor, 20@25%; Regulars..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe..... 55@60%
Prentiss ..... 20@25%
Rock Island 25%
Snediker's X. L..... 33⅓%
Stephens' 33⅓%

Saw Filers

Disston's D 3 Clamp and Guide, ℔ doz., $24.00, 30%; Clamps..... 30%
Perfection Saw Clamps, ℔ doz....$4.80
Reading 60%

Wood Workers—

Fulton Mach. & Vise Co.:
Reed 25%
Star 40%
Massey Vise Co.:
Lightning Grip, 15%; Perfect.....15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe..... 40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.
Rock Island Pipe..... 25%

Wads—*Price per M.*

B. E., 11 up	.60¢	
B. E., 9 and 10	.70¢	
B. E., 8	.80¢	
B. E., 7	.80¢	
P. E., 11 up	$1.00	*Dis. 15%*
P. E., 9 and 10	1.25	
P. E., 8	1.50	
P. E., 7	1.50	
Ely's B. E., 11 and larger	$1.70@1.75	
Ely's P. E., 12 to 20	$3.00@3.25	

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled ..... *45&10%*
Ground ..... *50&5%*
Plain or Unground..... *60%*
Country Hollow Ware, per 100 lbs. *$3.00*
White Enameled Ware:
Maslin Kettles..... *65&10%*
Covered Wares:
Tinned and Turned..... *35&10%*
Enameled ..... *45&10%*
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware..... 33⅓%
Iron Clad Ware..... 70&10%
Lava and Volcanic, Enameled..40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	45¢	50¢	55¢	65¢

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles..... 60%
Porcelained ..... 50&50&10%
Never Break Spiders and Griddles..... 65&5%
Never Break Kettles..... 50%
Solid Steel Spiders and Griddles.65&5%
Solid Steel Kettles..... 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

Solid Zinc: ℔ doz.
Crescent, family size, bent frame.$4.05
Red Star, family size, stationary protector $4.05
Double Zinc Surface:
Saginaw Globe, family size, stationary protector..... $3.55
Cable Cross, family size, stationary protector..... $3.60
Single Zinc Surface:
Naiad, family size, open back, perforated $3.00
Single Saginaw Globe..... $2.85
Brass Surface:
Brass King, Single Surface, open back $4.05
Nickel Plate Surface:
No. 1901 Nickel Plate, Single Surface $3.60
Glass Surface:
Glass King, Single Surface, open back $3.95
Enamel Surface:
Enamel King, Single Surface, ventilated back..... $3.95

Washers—Leather, Axle—

Solid ..... *90@90&10%*
Patent ..... *90@90&10%*
Coil: ⅜ 9¢. 1 10¢. 1⅛ 11¢. 1¼ 11¢. *Inch. per box*

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers....$4.65 3.75 2.45 2.25 2.05
The above prices are based on $6.75 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots per lb. 1½@1¾¢

Wedges—

Oil Finish.....*lb., 2¼@2¾¢*

Weights—Hitching—

Covert Mfg. Co..... 30&2%

Sash—

Per net ton, f.o.b. factory:
Eastern District.....*$21.00@—*
Western and Central Districts ..... *$21.00@$22.00*

Wheels, Well—

8-in., $2.00; 10-in., $2.45; 12-in., $3.25; 14-in., $4.45.

Wire and Wire Goods—

Bright and Annealed:
6 to 9.....72¢&10¢7½%
10 to 18.....72½¢&10¢10%
19 to 26.....75¢&10¢&2½%
27 to 36.....77½¢7½%
Galvanized:
6 to 9.....72½¢&10%
10 to 14.....72½¢&10¢5%
15 to 16.....72½¢&10¢5%
17 to 18.....72½%
19 to 26.....70¢&5¢&2½%
27 to 36.....65¢&10¢10%
Coppered:
6 to 9.....65¢&10¢10%
10 to 14.....70¢&10¢5%
15 to 18.....65¢&10¢&10%
19 to 26.....70¢&5¢&2½%
27 to 36.....72½¢&10¢2½%
Tinned:
6 to 18.....67¢&10¢10%
Brass ..... *17¢ lb., base*
Copper ..... *32¢ lb., base*
Cast Steel Wire..... 50%

Spooled Wire—

Annealed and Tinned, 70¢&10¢&10¢10%
Brass and Copper...60¢&10¢&10¢10%
Retailers' Assortments, per box, $2.10@$2.40
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods..90¢&33⅓@—%
Brass Wire Goods....90@90&10%
Brass Cup and Shoulder Hooks, 85¢&10%

Wire Cloth and Netting—

Galvanized Poultry Netting, 80¢&2½@80¢&7½%
Painted Screen Cloth, 100 ft., $1.35
Standard Galv. Hardware Grade: 100 ft. rolls, 2½ to 48 in. wide, per 100 sq. ft.
Nos. 2, 2½ and 3 Mesh....$2.75
Nos. 4 and 5 Mesh.....$3.00
No. 6 Mesh.....$3.25
Nos. 7 and 8 Mesh.....$3.75

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural ..... *80¢&10¢10%*
Alligator or Crocodile..70¢&10@75%
Baxter Patent S Wrenches... 70¢&5@70¢&10%
Drop Forged S.....*45@45¢&5%*
Acme ..... 60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Steel Handle Nut..... 50%
Combination Black..... 40&5%
Merrick Pattern..... 50%
Boardman's 40%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl..40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes', Genuine Hammer Handle..... 40&10&5&5%
Coes' "Mechanics'"...40&10&10&5&5%
Donohue's Engineer..... 40&10%
Eagle 70%
Gem Pocket..... 30%
Hercules 70%
W. & B. Machinist:
Case lots..... 50&5%
Less than case lots..... 50%
W. & B. Railroad Special:
Case lots..... 50%
Less than case lots.....40&10&5%
Solid Handles, P., S. & W., 50&10%; full cases..... 50&10&5%
Stillson 65%
Uwanta Wrench Co.:
Uwanta Special, Iron Handle, 40&10&5%
Other Wrenches..... 50%
Vulcan and Agrippa Chain..... 50%
Whitaker Machinists':
Case lots..... 50&10%
Less than case lots..... 50%

Wrought Goods—

Staples, Hooks, &c., list March 17, '92..... *85¢&10&10%*

Zinc— *(Cask lots at mill.)*

Sheet.....*per 100 lb. $7.06*

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1½ in. round and square; 1½ to 4 in. x ⅜ to 1 in. ..... ₩ ℔ 1.90¢
1½ to 4 in. x ¼ to 5-16 ..... ₩ ℔ 2.10¢
Rods—⅜ and 11-16 round and square ..... ₩ ℔ 2.10¢

Angles:	Cts ₩ ℔
3 in. x ¼ in. and larger	2.25¢
3 in. x 5-16 in. and ⅛ in.	2.50¢
1½ to 2½ in. x ⅛ in.	2.30¢
1½ to 2¾ in. x 5-16 in. and thicker	2.25¢
1 to 1¼ in. x 5-16 in.	2.30¢
1 to 1¼ x ⅛ in.	2.35¢
⅞ x ⅛ in.	2.50¢
¾ x ⅛ in.	2.60¢
⅝ x ⅛ in.	3.65¢
½ x 3-32 in.	4.15¢
Tees:	
1 in.	2.60¢
1¼ in.	2.40¢
1½ to 2½ in.	2.30¢
3 in. and larger	2.35¢
Beams	2.25¢
Channels, 3 in. and larger	2.25¢
Bands—1½ to 6 x 3-16 to No. 8	2.45¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
"Ulster"	3.50¢
Norway Bars	3.50¢

Merchant Steel from Store—

	per ℔
Bessemer Machinery	2.10¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black

	One Pass, C.R. Soft Steel.	R. G. Cleaned.
No. 14	₩ ℔ 2.50	2.90¢
Nos. 18 to 21	₩ ℔ 2.95	3.10¢
No. 27	₩ ℔ 3.15	3.40¢
No. 28	₩ ℔ 3.20	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment, W. Dewees wood ..... ₩ ℔ 11½@14½¢
Patent Planished ..... ₩ ℔ A, 10¢; B, 9¢, net.

Galvanized.

Nos. 14 to 16 ..... ₩ ℔, 3.15¢
Nos. 22 to 24 ..... ₩ ℔, 3.55¢
No. 27 ..... ₩ ℔, 4.00¢
No. 28 ..... ₩ ℔, 4.25¢
No. 20 and lighter 36 inches wide, 25¢ higher.

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:
IC, 14 x 20 ..... $6.40
IX, 14 x 20 ..... 7.65

A. Charcoal:
IC, 14 x 20 ..... $5.45
IX, 14 x 20 ..... 6.55

American Coke Plates—Bessemer-
IC, 14 x 20 ..... 107 ℔ $4.45
IX, 14 x 20 ..... 5.45

American Terne Plates—
IC, 20 x 28 with an 8 lb. coating $8 60
IX, 20 x 28 with an 8 lb. coating 10.60

Seamless Brass Tubes—

List December 4, 1905. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List December 4, 1905. Base price 18¢

Copper Tubes—

List December 4, 1905. Base price 21¢

Brazed Brass Tubes—

List June 6, 1898. 21 ¢ ₩ ℔

High Brass Rods—

14¾¢ ₩ ℔

Roll and Sheet Brass—

List June 6, 1898. 14½¢ ₩ ℔

METALS—

Tin—

Straits Pig ..... ₩ ℔ 31 @32 ¢

Copper—

Lake Ingot ..... ₩ ℔ 14 @14¼¢
Electrolytic ..... ₩ ℔ 14 @14¼¢
Casting ..... ₩ ℔ 13½@13¾¢

Sheet Copper Hot Rolled, 16 oz. ..... ₩ ℔ 17@..¢
" " 14 " ..... " " 1..@..¢
Sheet Copper Cold Rolled, 1¢ ₩ ℔ advance over Hot Rolled.
Sheet Copper Polished 20 in. wide and under, 1¢ advance over Cold Rolled.
Sheet Copper Polished over 20 in. wide, 2¢ advance over Cold Rolled.
Bottoms, Pits and Flats ..... ₩ ℔ 21¢ basis
Planished Copper, 1¢ ₩ ℔ more than Polished.

Spelter—

Western ..... ₩ ℔ 5¾@6 ¢

Zinc.

No 9, base, casks, ₩ ℔ 7.50¢ | Open ..... ₩ ℔ 8.00¢

Lead.

American Pig ..... ₩ ℔ 4½@5¼¢
Bar ..... ₩ ℔ 6 @6¼¢

Solder.

½ & ¼, guaranteed ..... ₩ ℔ 19½@20 ¢
No. 1 ..... ₩ ℔ 17½@18¼¢
Refined ..... ₩ ℔ 15½@16 ¢
Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson ..... ₩ ℔ ..@11¢
Halletts ..... @10½¢
Other Brands ..... @9½¢

Bismuth—

Per ℔ $1.75

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:
Small lots ..... 38¢
100-℔ lots ..... 37¢
Rods & Wire ..... Base Price 38¢
Sheets ..... Base Price 40¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy and Wire	₩ ℔ 10.75@11.00¢
Copper, Light and Bottoms	₩ ℔ 10.00@10.25¢
Brass, Heavy	₩ ℔ 8.00@ 8.25¢
Heavy Machine Composition	₩ ℔ 10.25@10.50¢
Clean Brass Turnings	₩ ℔ 6.75@ 7.25¢
Composition Turnings	₩ ℔ 8.00@8.50¢
Lead, Heavy	₩ ℔ ....@ 3.50¢
Tea Lead	₩ ℔ ....@ 3.25¢
Zinc Scrap	₩ ℔ ....@ 3.00¢
No. 1 Yard Wrought, Long	$....@ 11.50
No. 1 Yard Wrought, Short	$....@10.50
Wrought Pipe	$....@ 8.50

THE IRON AGE

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